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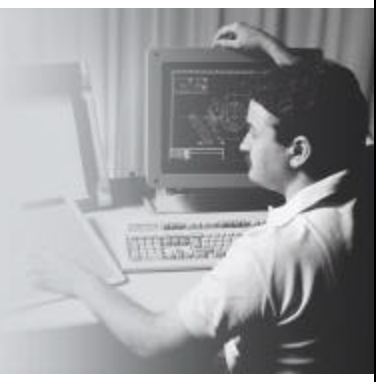

PLM316

Maintenance Processing: Controlling and Reporting

THE BEST-RUN BUSINESSES RUN SAP

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- System: R/3 – Enterprise
- 2005/Q2
- Material number: 50071609

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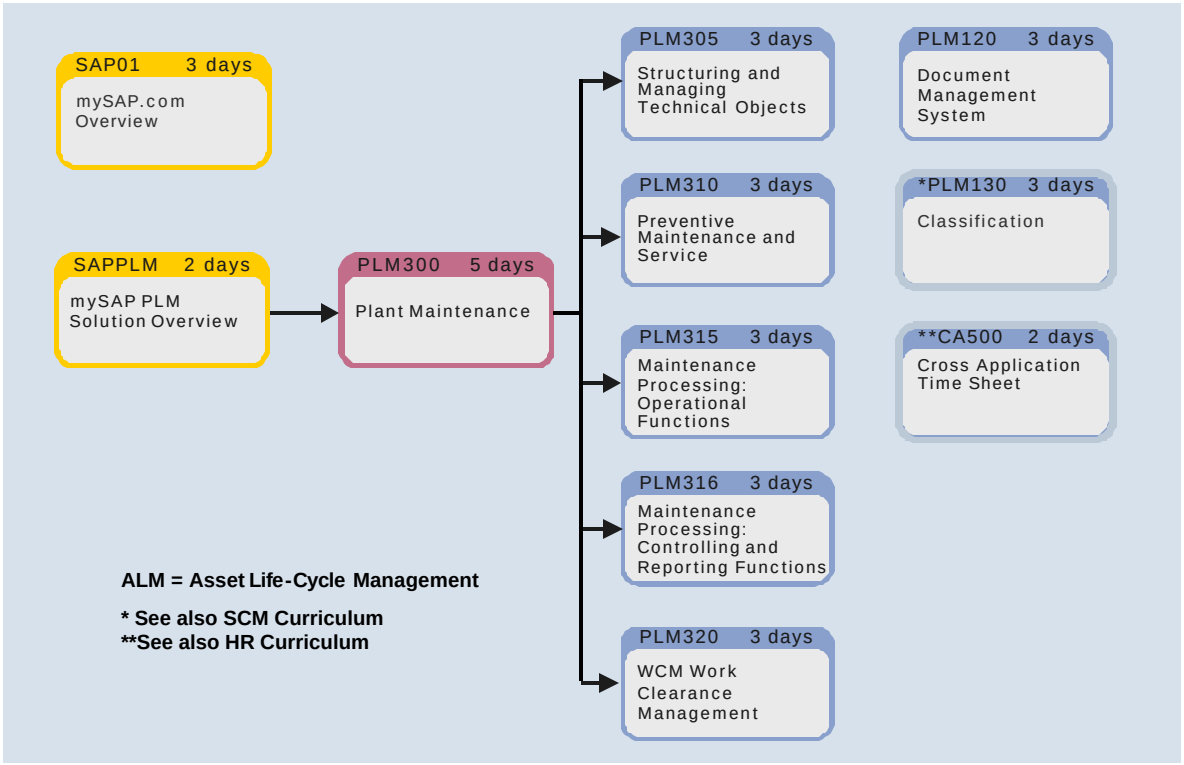
mySAP PLM (ALM Plant Maintenance)



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Course Prerequisites

- PLM300 Plant Maintenance

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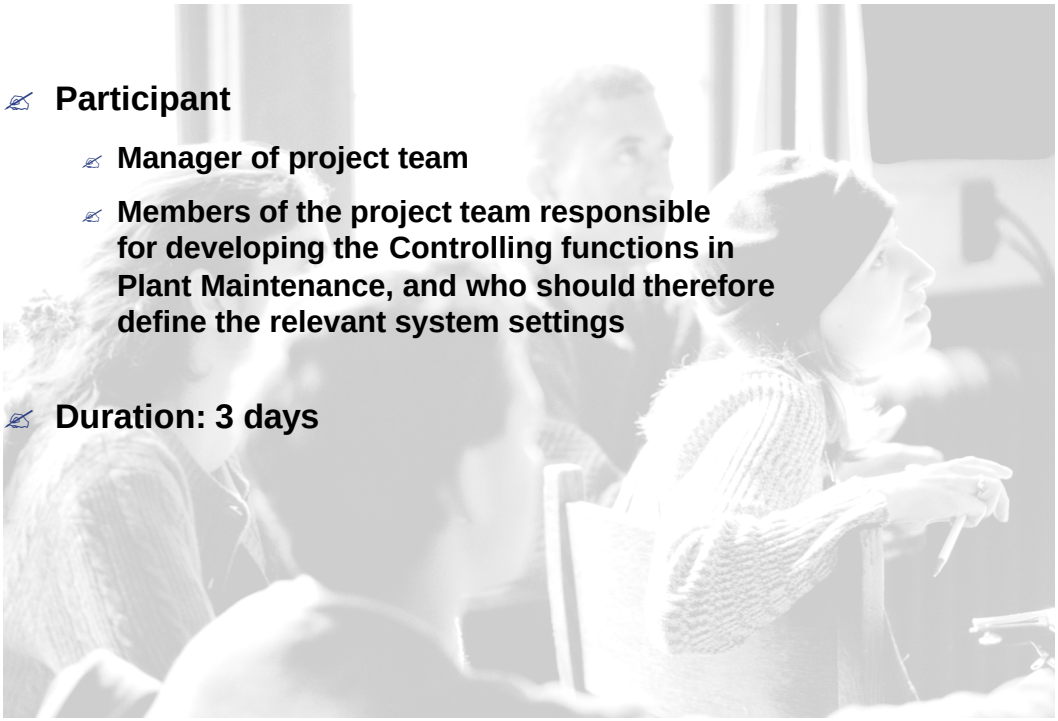
Target Group



- **Participant**
  - **Manager of project team**
  - **Members of the project team responsible for developing the Controlling functions in Plant Maintenance, and who should therefore define the relevant system settings**
- **Duration: 3 days**

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Notes to the user

- The training materials are **not teach-yourself programs**. They **complement the course instructor's explanations** . Your material includes space for noting down this additional information.

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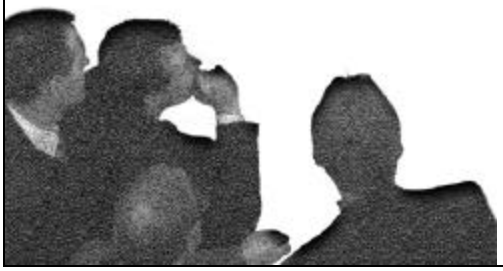
Course Overview

Contents:

- **Course goal**
- **Course objectives**
- **Course content**
- **Course overview diagram**
- **Main business scenario**



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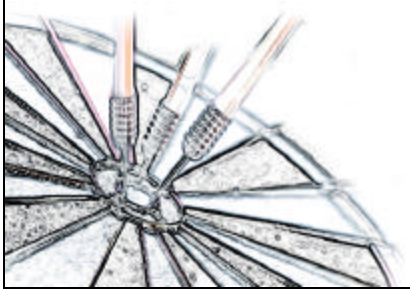
Course Goal

At the conclusion of this course, you will be able to:

- **Perform Controlling for maintenance orders**
- **Use the standard analyses in the Plant Maintenance Information System (PMIS) and describe their structure**
- **Describe the reporting functions of the Business Information Warehouse (BW) together with the business content for Plant Maintenance**



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Course Content

Preface

Unit 1	**Course overview**	Unit 5	**Budgeting and cost planning**
Unit 2	**Introduction**	Unit 6	**Business Intelligence**
Unit 3	**Costs in maintenance process**		
Unit 4	**Settlement of orders**		

Appendix

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Main Business Scenario

- In the company, technical, cost-oriented, object-based and area-specific details should be evaluated. The Plant Maintenance Information System (PMIS) is used for this purpose.
- Cross-system analyses should also be possible, based on the heterogeneous system landscape. BW should be used for this.

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Introduction

- **Cost tracking in maintenance processes and organizational structures**

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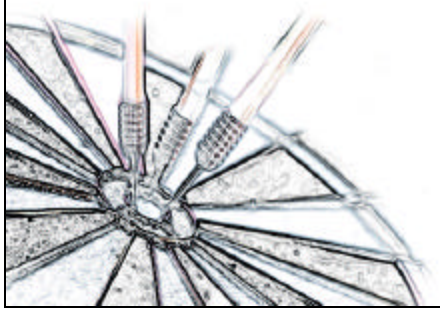
Unit Objectives

At the conclusion of this unit, you will be able to:

- **Describe the value flow for the different processes in Plant Maintenance**
- **Describe the relevant organizational units in Financial Accounting and Cost Accounting, and their link to Plant Maintenance**



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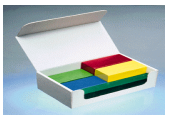
Course Overview Diagram

Course Overview

Settlement of Orders



Introduction

Budgeting and Cost Planning

Costs in maintenance process

Business Intelligence

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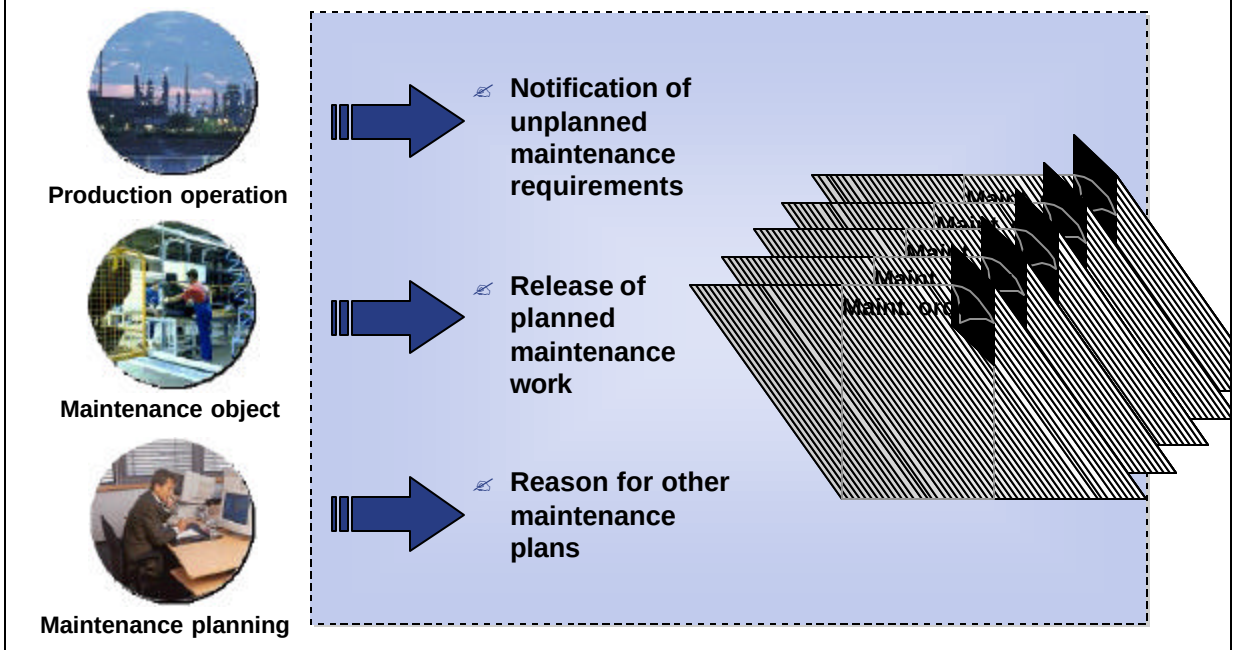
Plant Maintenance Process Overview



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- You can generate a maintenance order in three ways:
  - In exceptional cases, owing to a breakdown or malfunction identified during production
  - As planned, resulting from the scheduling of object-based maintenance plans, in which the periodic due dates for inspection and maintenance work were determined
  - Through other scheduled maintenance plans, such as revisions, modifications, or new developments executed depending on requirements and capacity levels
- The maintenance order is thereby a critical integration object within the SAP components. It contains all the business information for monitoring the cost of maintenance activities.

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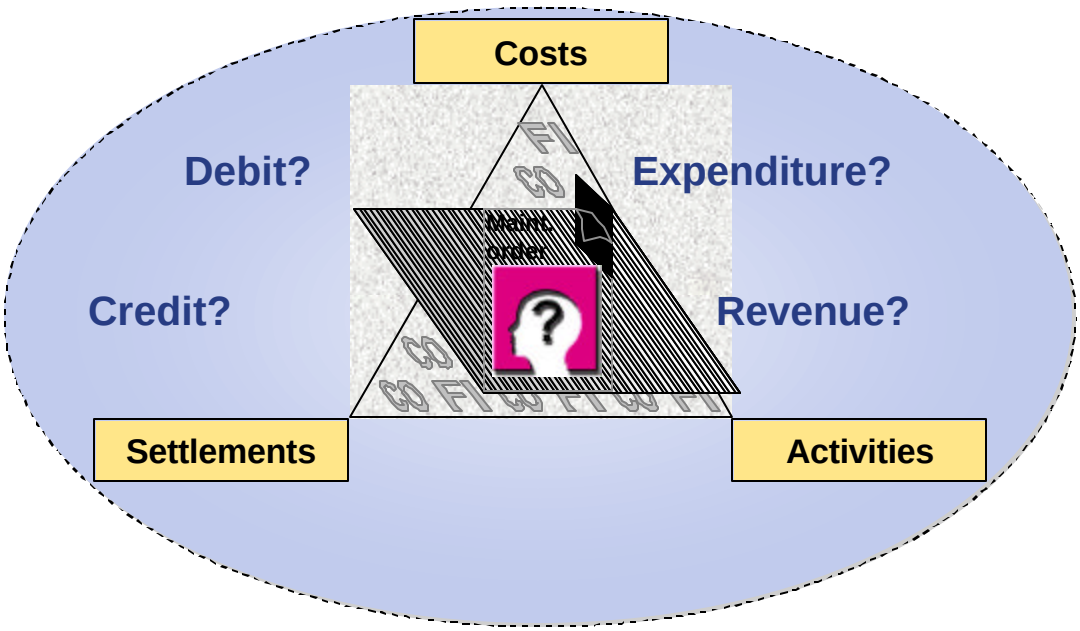
Value Concepts in Plant Maintenance



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- Based on the type of task (order type) and the processing stage, the values in the order can be differentiated according to costs, activities and settlements.
- **Costs:** In general, costs refer to the consumption of resources in order to ensure the necessary operational production capacity.
- **Activities:** Activities are the result of the products and services required to execute an operation.
- **Settlements:** Settlements are the partial or complete transfer of costs from one object to another.
- The maintenance order is **debited** with **costs** at the rate of the respective resources consumed.
- **Settlement** means that the order is **credited** by transferring costs to another object.
- The **costs** of an order generally correspond to **expenditure** , whereas **activities** cannot normally be seen as **revenue** , since they are not sold.

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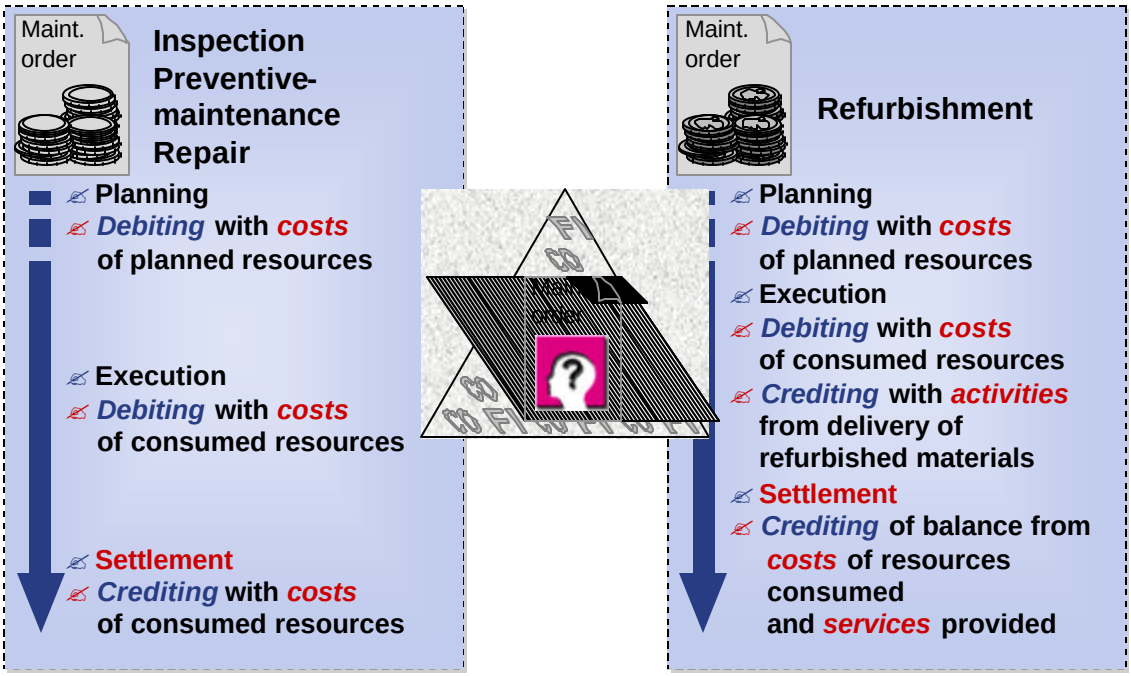
Value Flow in the Maintenance Processes



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- In the case of the repair, inspection, or maintenance order, the respective order is:
  - Debited with planned costs of required resources
  - Debited with the actual costs of these resources each time resources are consumed
  - Credited with the relevant actual costs settled (through settlement, the order forwards the costs of resources consumed)
- In the case of a refurbishment order, the order is:
  - Debited with the planned cost of required resources
  - Debited with the actual costs of these resources each time resources are consumed
  - Credited with the value of the refurbished materials following delivery
  - Credited with the relevant actual costs settled (through settlement, the order forwards the difference between the actual cost of resources consumed and services)
- In general, activities and settlements are classed as negative costs.

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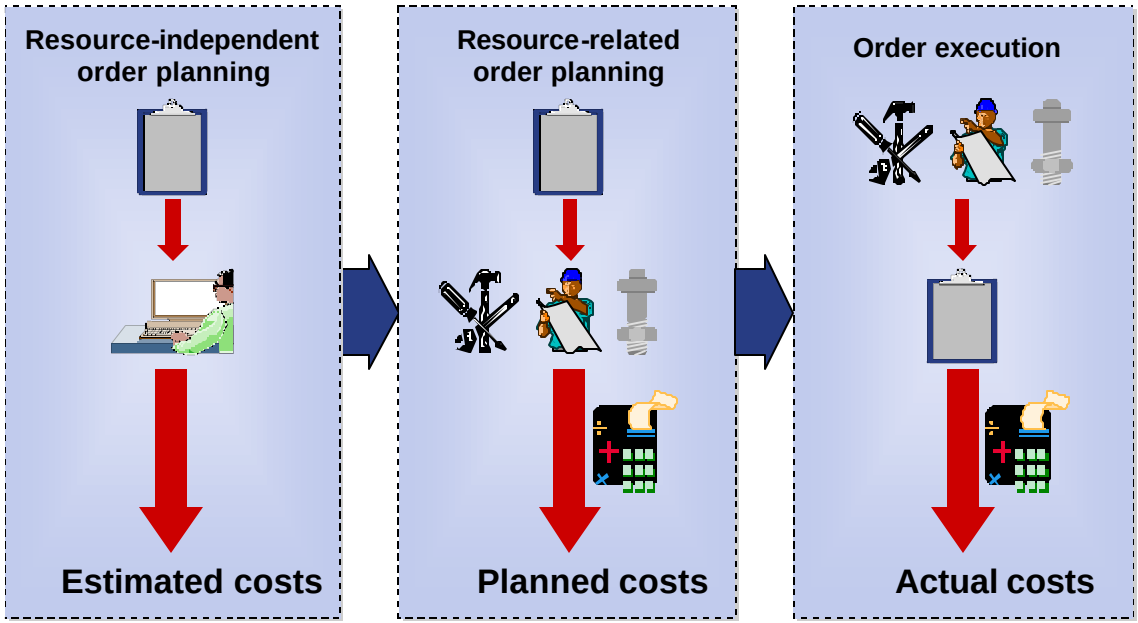
Costs in the Maintenance Processes



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- Depending on the stage of order processing, you can differentiate between the following costs:
  - **Estimated costs**
    In resource-independent order planning, to specify the expected costs for an order.
    The estimated costs are entered manually in the order.
  - **Planned costs**
    The system automatically determines planned costs for the order when order-specific resources are scheduled (operations with internal service, materials...).
    You cannot maintain planned costs manually.
  - **Actual costs**
    Since resources (internal services, materials...) are consumed for an order, the order is automatically debited with actual costs during costing.
    You cannot enter actual costs manually.

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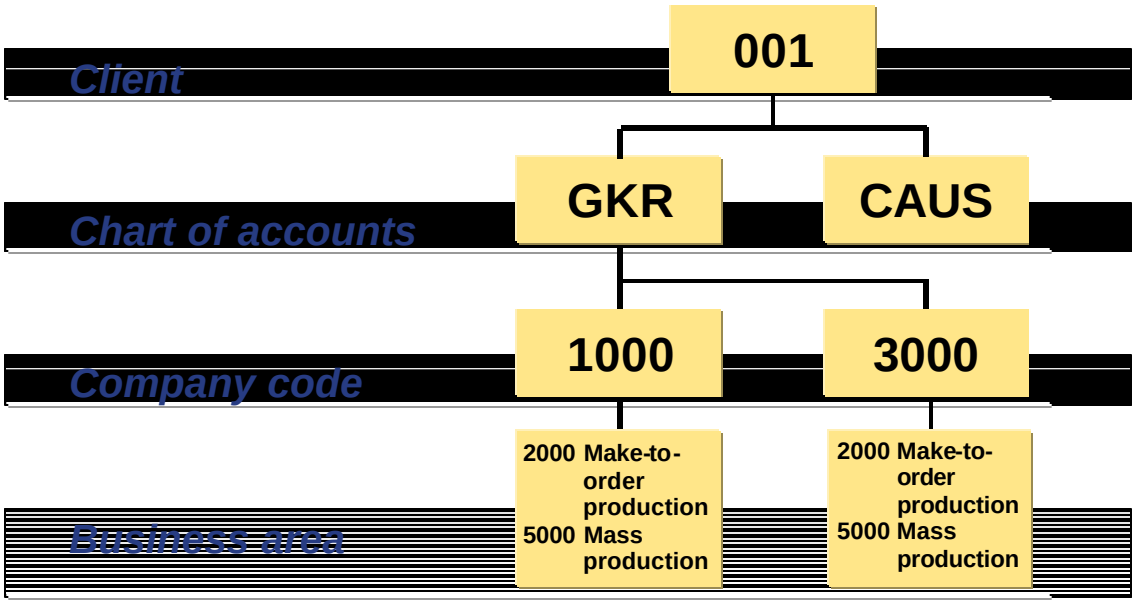
Organizational Structure (1)

Enterprise View: Financial Accounting



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- **Client:** The client represents the company, and forms the data basis for the entire company.
- **Chart of accounts:** Each company code in the SAP system uses G/L accounts from one specific chart of accounts. The general ledger accounts are unique within a chart of accounts.
  The identification of the chart of accounts can be freely defined.
- **Company code:** In Financial Accounting, business transactions are mainly entered, saved, further processed and managed at the level of company code. You can set up several company codes for each client, so that you can process the accounts of several independent companies/subsidiaries at the same time. You must set up at least one company code.
- **Business area:** The business area represents an organizational unit, for which an internal reporting procedure can be created. More than one business area can be attributed to a company code; these business areas can also be valid for other company codes. The business areas must therefore have the same importance in all company codes. The use of this organizational level is optional. You use business areas to create balance sheets and profit and loss statements for additional internal areas, as well as for company codes.

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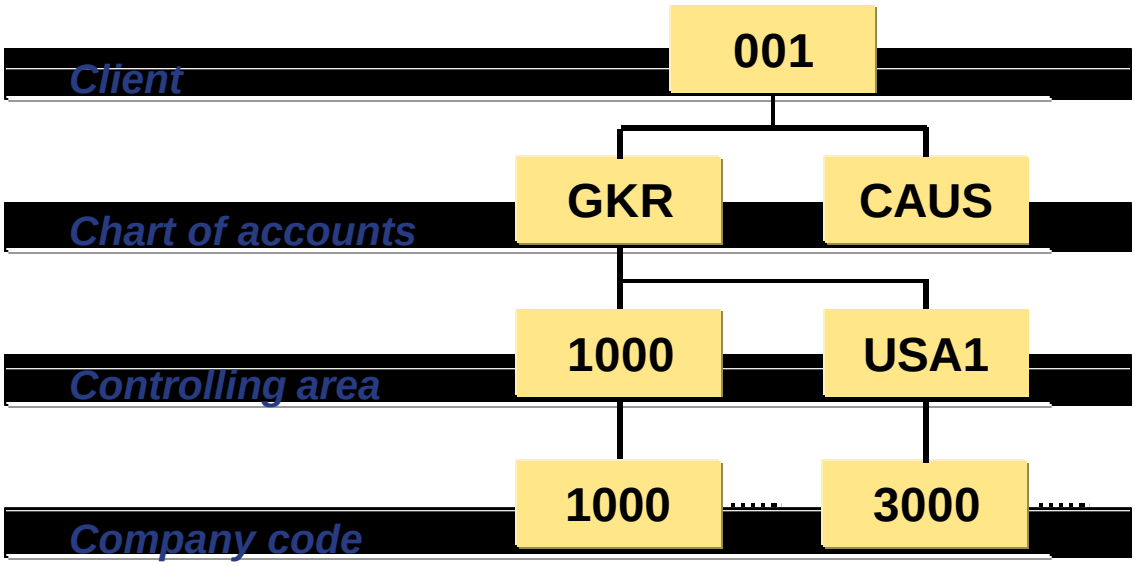
Organizational Structure (2)

Enterprise View: Cost Accounting



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- **Client:** The client represents the company, and forms the data basis for the entire company.
- **Chart of accounts:** Each company code in the SAP system uses G/L accounts from one specific chart of accounts. The general ledger accounts are unique within a chart of accounts.
  The identification of the chart of accounts can be freely defined.
- **Controlling area:** Complete cost accounting can be performed within a controlling area. You can assign more than one company code to a controlling area for the purposes of cost accounting for all company codes.
- **Company code:** In Financial Accounting, business transactions are mainly entered, saved, further processed and managed at the level of company code. You can set up several company codes for each client, so that you can process the accounts of several independent companies/subsidiaries at the same time. You must set up at least one company code.

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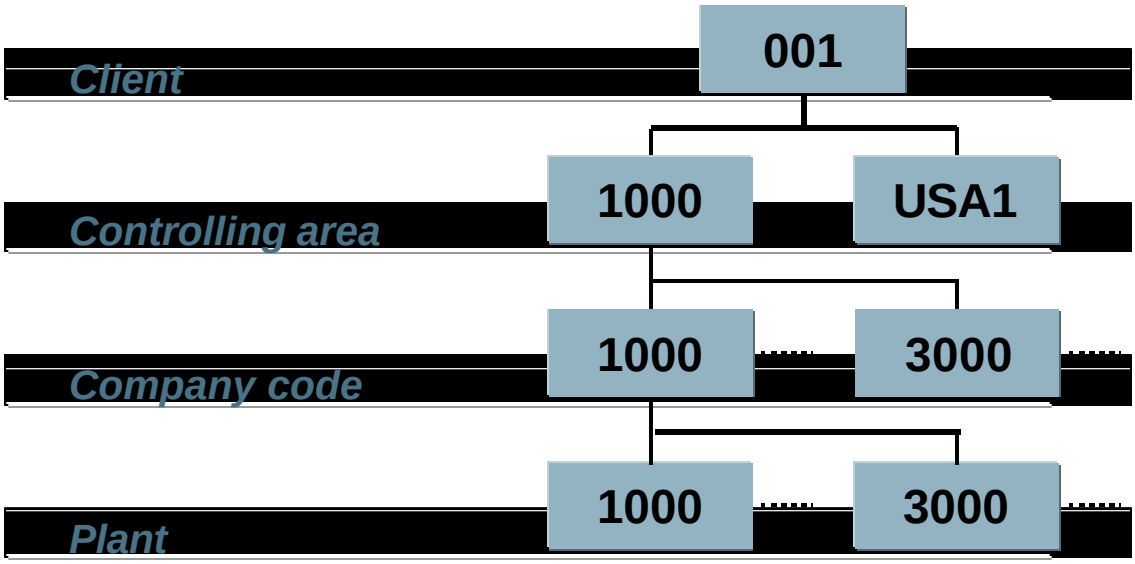
Organizational Structure (3)

Enterprise View: Plant Maintenance



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- **Client:** The client represents the company, and forms the data basis for the entire company.
- **Controlling area:** Complete cost accounting can be performed within a controlling area.
- **Company code:** The company code is an organizational unit in financial accounting and represents an independent unit to be balanced. From a cost accounting perspective, a company code is assigned to a controlling area.
- **Plant:** The plant is a very important unit in Logistics. It generally represents a production location within a company, and is assigned to the company using the company code.

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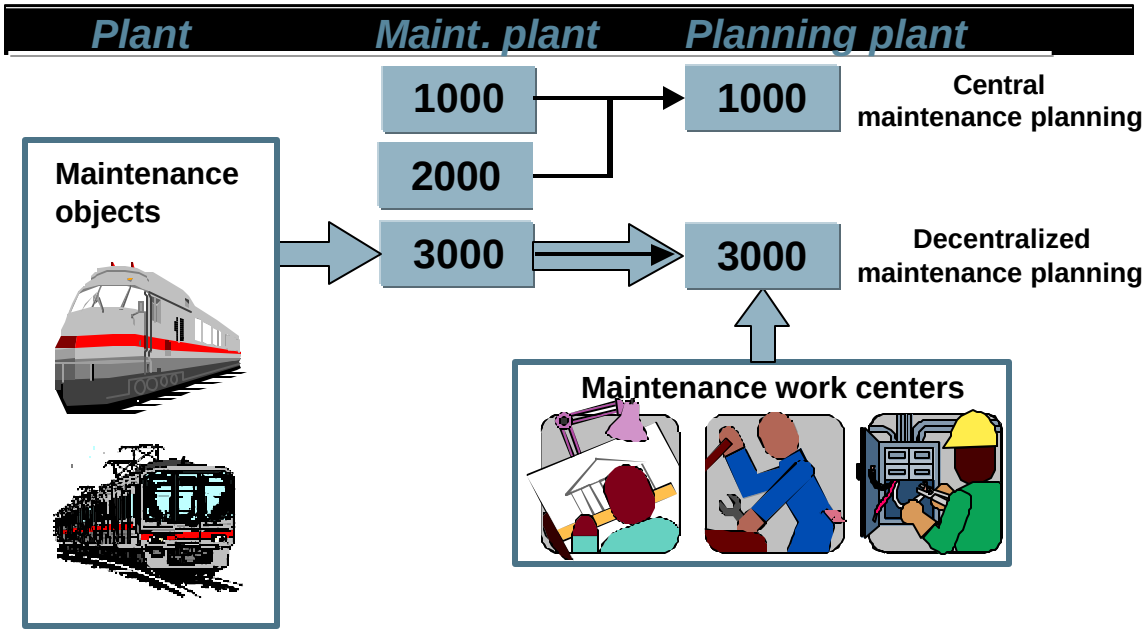
Organizational Units in Plant Maintenance

Significance of plant



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- **Maintenance plant:** The maintenance plant is the plant where the technical systems or objects of a company are installed.
- **Maintenance planning plant:** The maintenance planning plant represents the organizational unit where maintenance requirements are planned. You can manage capacity units in Plant Maintenance as maintenance work centers here.
- A maintenance planning plant can plan the maintenance requirements for several maintenance plants. If maintenance planning is undertaken in a maintenance plant, the plant is also a maintenance planning plant.

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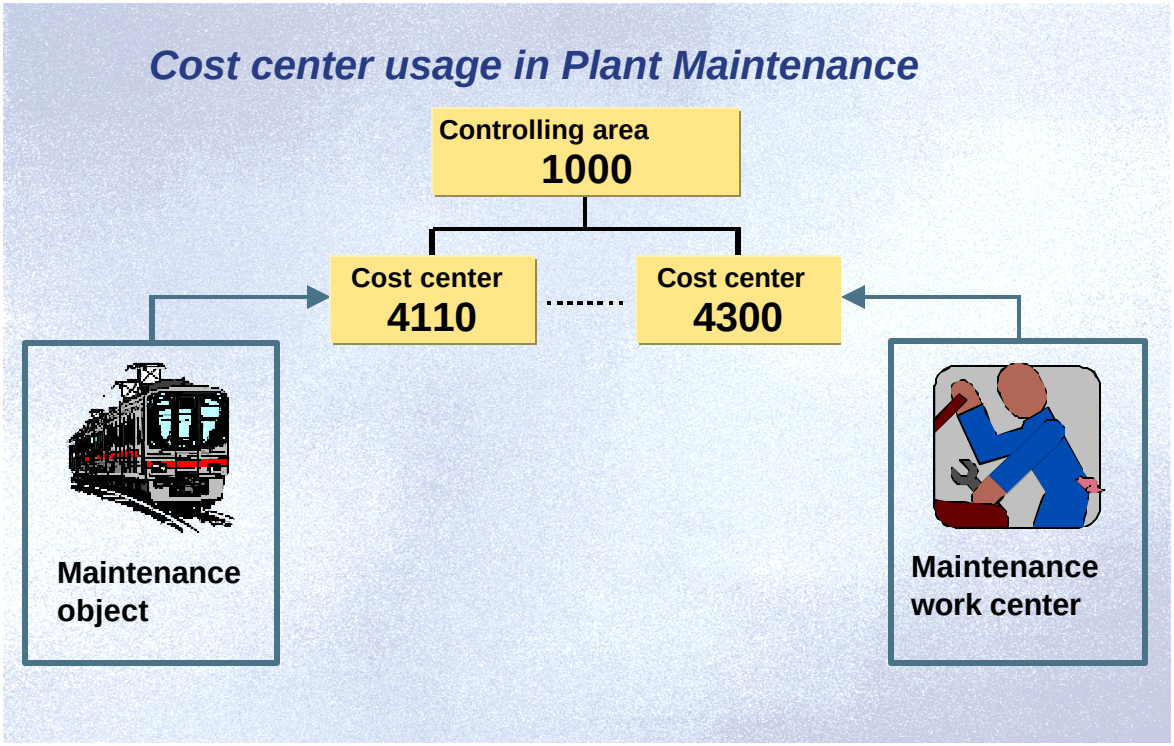
Organizational Units in Cost Accounting



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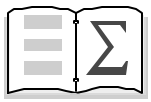
- **Cost center:** A cost center is an organizational unit within a controlling area that clearly indicates a separate area where costs arise. You can make this delimitation from a functional, accounting, spatial and/or cost stewardship perspective.
- You can use a cost center in Plant Maintenance to:
  - Define the cost stewardship for a specific maintenance object
  - Establish the organizational assignment of a work center from a cost accounting perspective.

Introduction: Unit Summary



You are now able to:

- **Describe the value flow for the different processes in Plant Maintenance**
- **Describe the relevant organizational units in Financial Accounting and Cost Accounting, and their link to Plant Maintenance**

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Costs in the Maintenance Process

- Estimated order costs
- Planned and actual cost determination in order
- Cost views in maintenance order
- Commitments management and overhead costing
- Special and additional functions of order-related cost controlling

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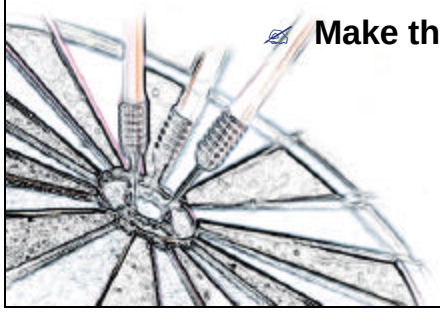
Unit Objectives

At the conclusion of this unit, you will be able to:

- **Perform a cost estimate**
- **Describe the rules and prerequisites for determining planned and actual costs**
- **Calculate overhead rates**
- **Manage commitments**
- **Use the different cost views**
- **Make the relevant settings in Customizing**



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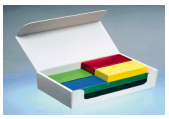
Course Overview Diagram

Course Overview

Settlement of Orders



Introduction

Budgeting and Cost Planning

Costs in maintenance process

Business Intelligence

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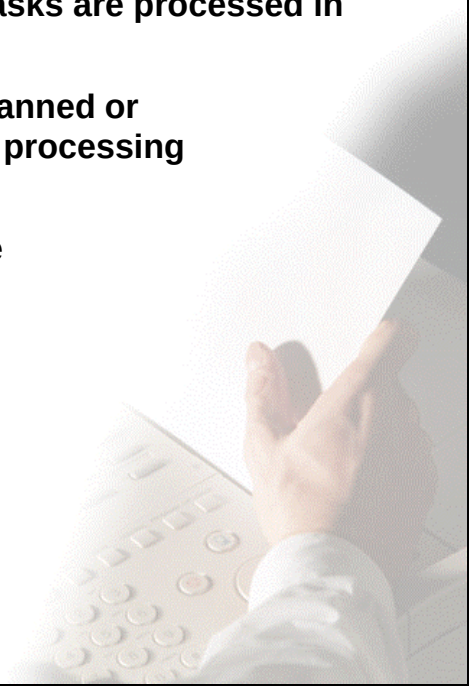
Business Scenario

- The costs of maintenance tasks are processed in the maintenance order.
- The costs can thereby be planned or monitored in detail for each processing phase of the order.
- Two different cost views are available for analysis.



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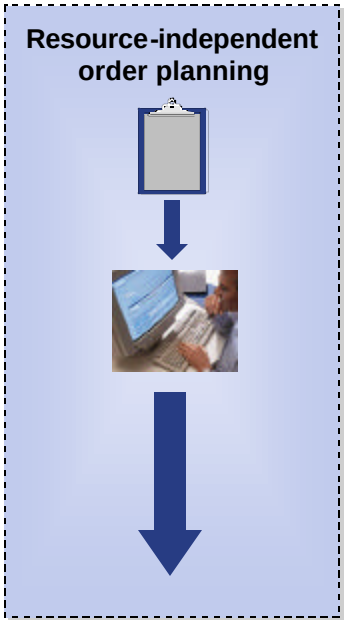
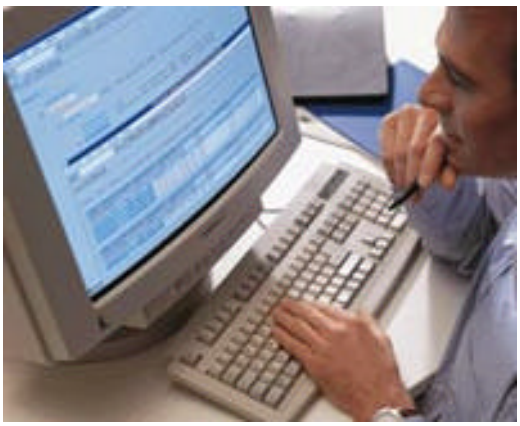
Estimated Costs of the Maintenance Order



- **Overall estimation**
- **Estimation based on value categories**



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- Before the order is released, you can enter estimated costs in the form of a manually entered cut-off value. You can enter these estimated costs in resource-independent order planning. This enables you to specify the expected costs for an order.
- Estimated costs are recorded in the *Plant Maintenance Information System* for subsequent evaluation.

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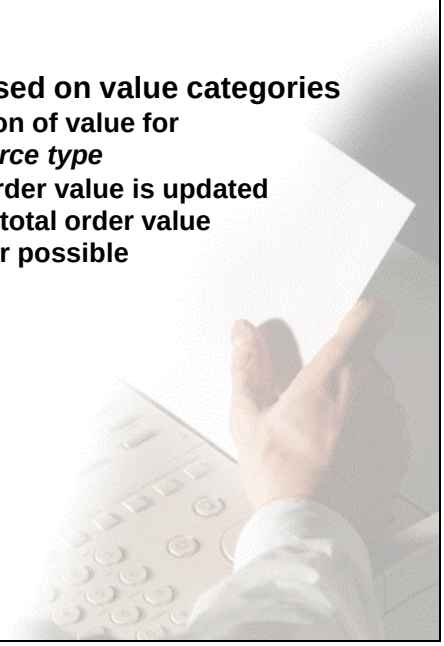
Options for Estimating Costs

- Order creation
- order planning
- Order release
- Order execution
- Order completion

- **Overall estimation**
  - Specification of total order value
  - Estimation based on value categories
- **Estimation based on value categories**
  - Specification of value for each *resource type*
  - The total order value is updated
  - Specifying total order value is no longer possible



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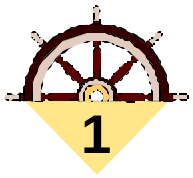
Relevant Settings



Cost estimation

- Definition of cost estimate version
- Definition of cost profile

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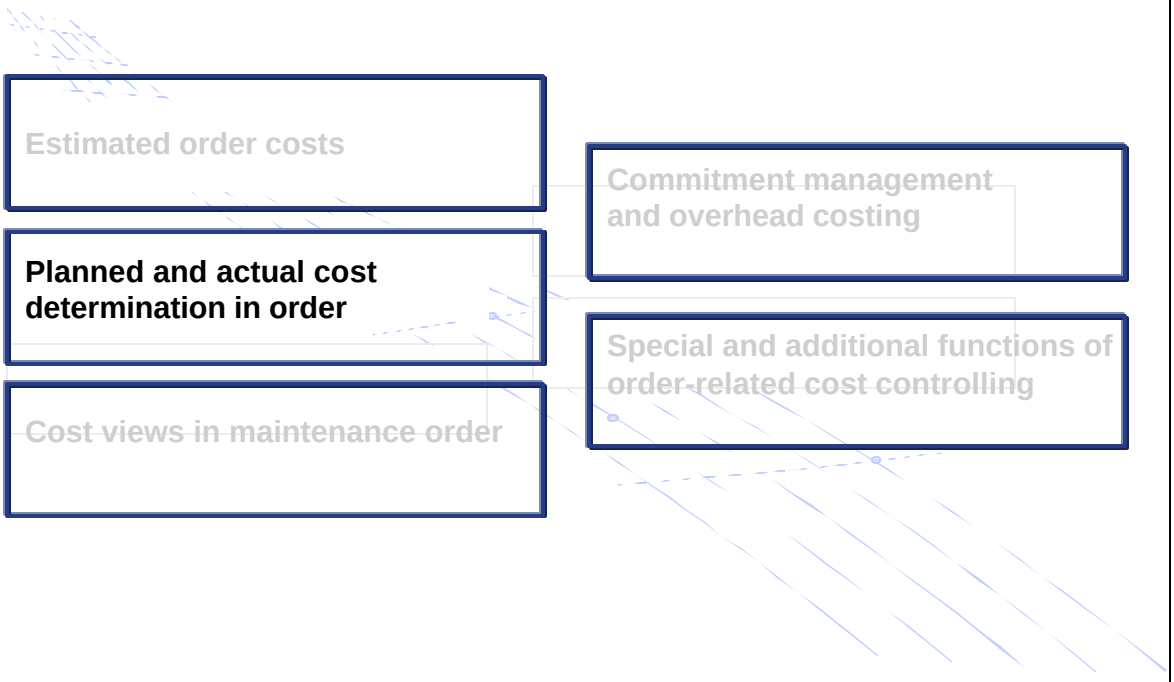
Planned and Actual Cost Determination in Order



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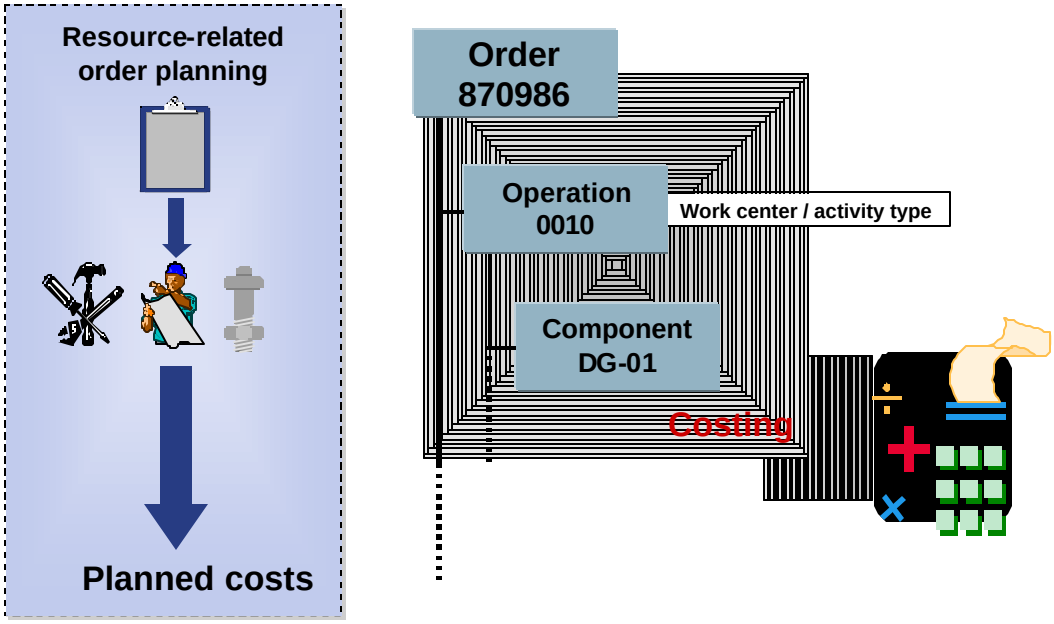
Planned Costs for the Order



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- **Planned cost calculation** in the order takes place automatically either when you save the order, or during order processing (if appropriate cost determinations function is initiated).

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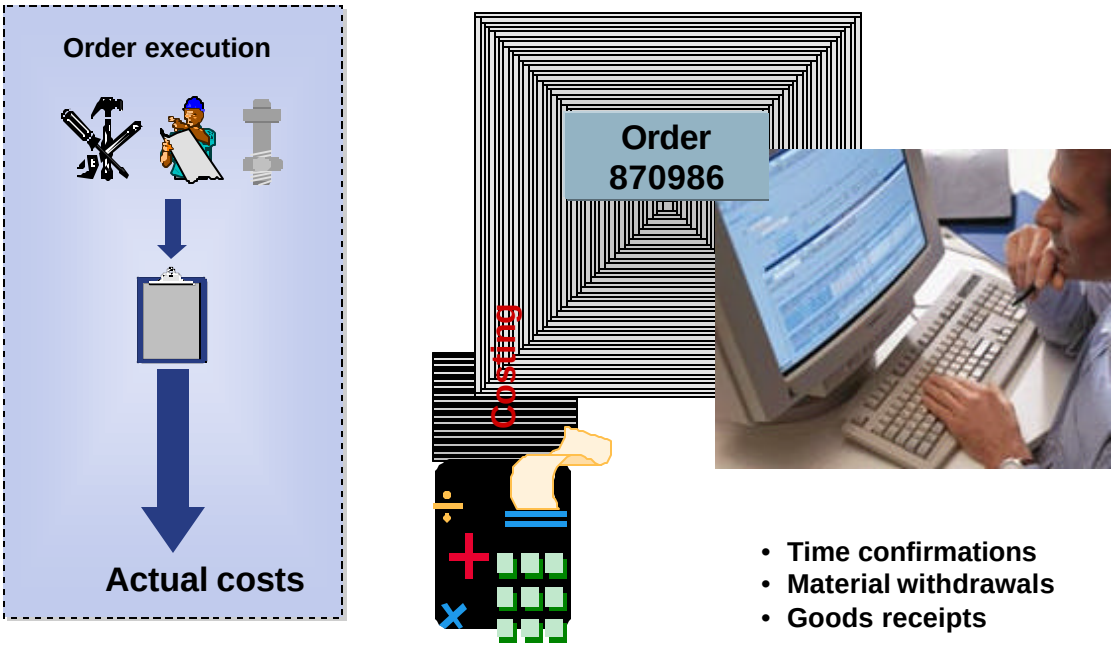
Actual Costs for the Order



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✍ The **actual cost calculation** takes place automatically each time resources are used and booked with reference to the order.

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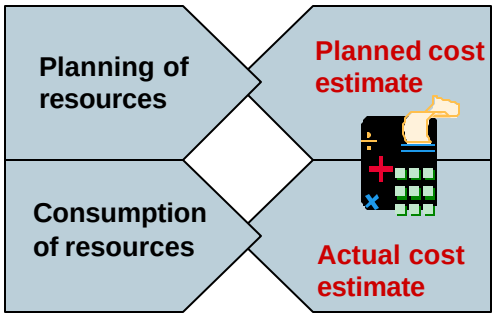
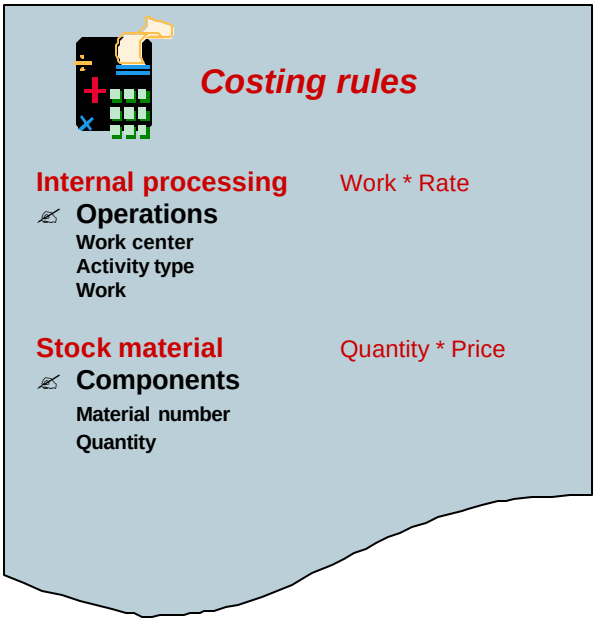
Valuing Order Resources





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- Both planned and actual costing procedures use specific rules for putting a value on resources. These rules can be the same for resources planned and resources consumed, but it is not imperative.
- In principle, the value placed on internal service assigned to an operation is calculated from the rate assigned to the activity type for this purpose.
- For stock materials, the price is taken from the material master records.

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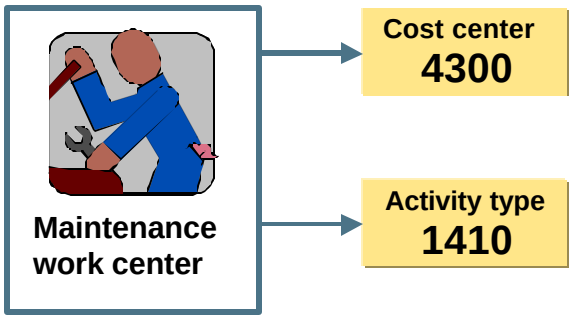
Putting a Value on Maintenance Work

Costing data for maintenance work center



Cost center	Activity type	Fixed rate	Variable rate
4010	1410	43.60	6.40
4100	1400	90.20	9.80
4100	1410	65.10	9.90
4300	1410	75.80	
4200	1400	83.90	
. . .			

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- **Activity type:** Activity types represent the activities performed in cost centers within a controlling area.
- Assignment of a maintenance work center to a cost center and the definition of activity types assigned to the cost center together form the basis for valuation of maintenance work.
- The charge for this maintenance work is defined in an activity type plan and is composed of fixed and variable components. This rate can then be used to put a value on activities in the cost estimate.

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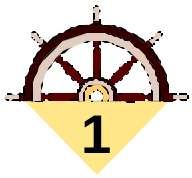
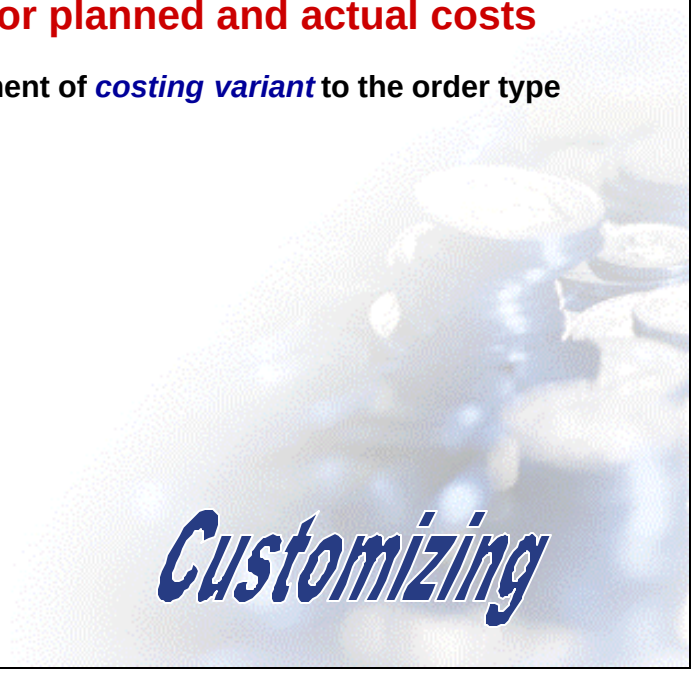
Relevant Settings



Costing for planned and actual costs

- Assignment of *costing variant* to the order type



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Costing Variants in Detail

Costing type

What is costing used for?

Product costing / **unit costing**

Valuation variant

How are *resource types* valued?

Pricing strategy

- Strategy sequence for material valuation
- Strategy sequence for internal processing
- Strategy sequence for external processing (operation)

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Cost Views in Maintenance Order

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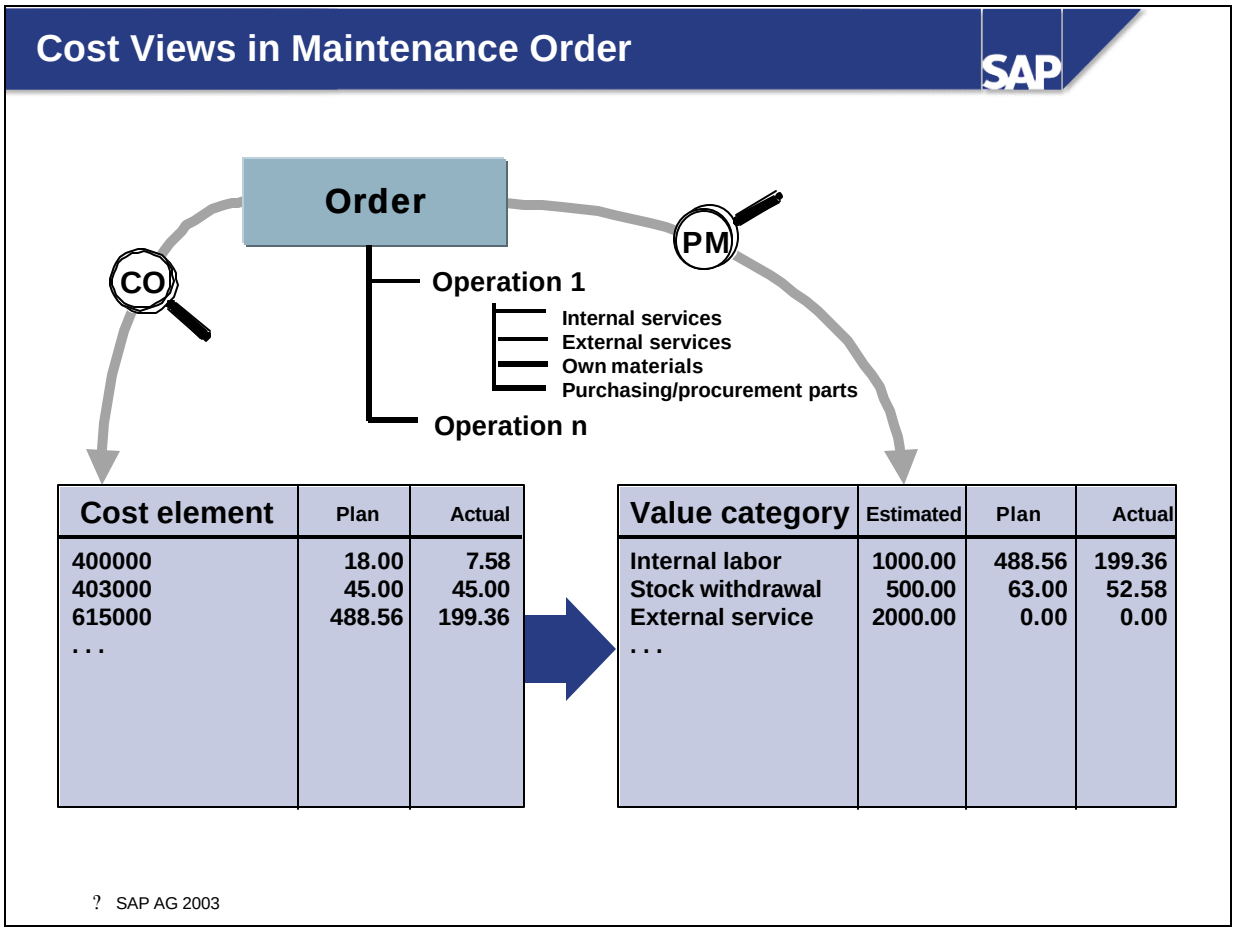

- Two views with differing levels of detail are used to monitor costs in the maintenance order:
- The cost report displays costs according to cost elements and thereby reflects the cost accounting view.
  You can also identify quantities here.
  Moreover, you can identify the amounts debited and credited during settlement.
- The cost overview displays the order costs in a condensed form, for example, after all the cost elements for stock materials have been combined into one value category for stock withdrawals. The focus here is more on displaying costs by type of resource rather than on account assignment of individual resources.
  You cannot identifie s and credits here.

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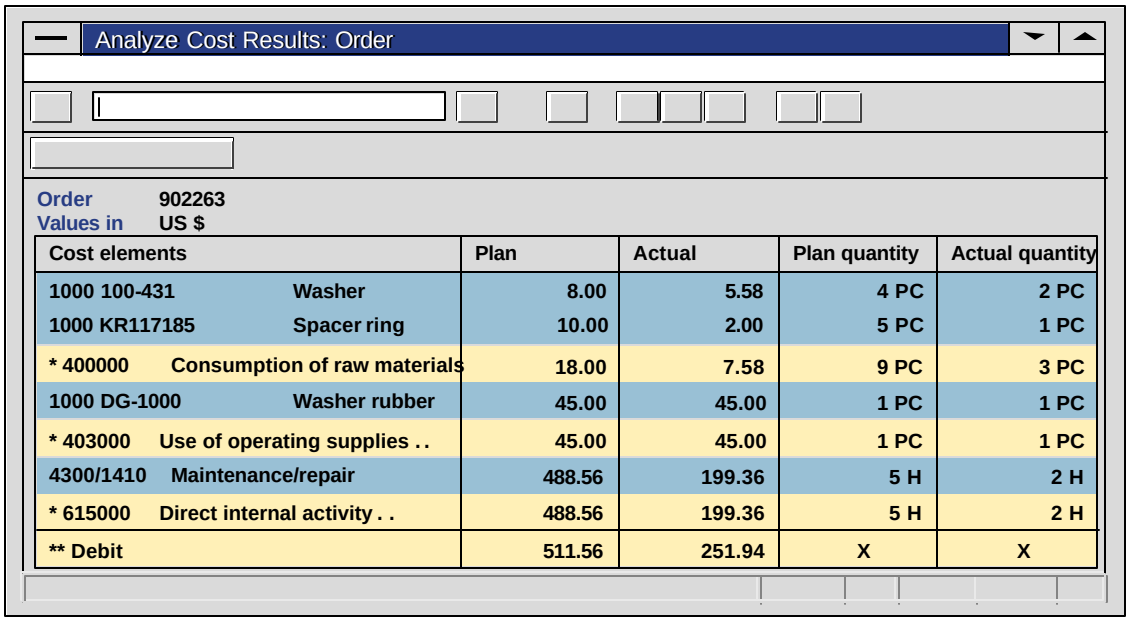
Detailed Cost Analysis with CO Report



Cost elements		Plan	Actual	Plan quantity	Actual quantity
1000 100-431	Washer	8.00	5.58	4 PC	2 PC
1000 KR117185	Spacer ring	10.00	2.00	5 PC	1 PC
* 400000	Consumption of raw materials	18.00	7.58	9 PC	3 PC
1000 DG-1000	Washer rubber	45.00	45.00	1 PC	1 PC
* 403000	Use of operating supplies . .	45.00	45.00	1 PC	1 PC
4300/1410	Maintenance/repair	488.56	199.36	5 H	2 H
* 615000	Direct internal activity . .	488.56	199.36	5 H	2 H
** Debit		511.56	251.94	X	X

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✍ In addition to identifying the costs incurred by a specific cost element, you can also use the cost report to analyze which planned or consumed resources were responsible for planned or actual costs.
For internal services, you can identify, for example, the main cost element and activity type and, for stock materials, the plant and material number.

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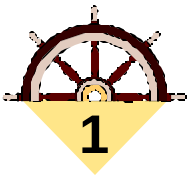
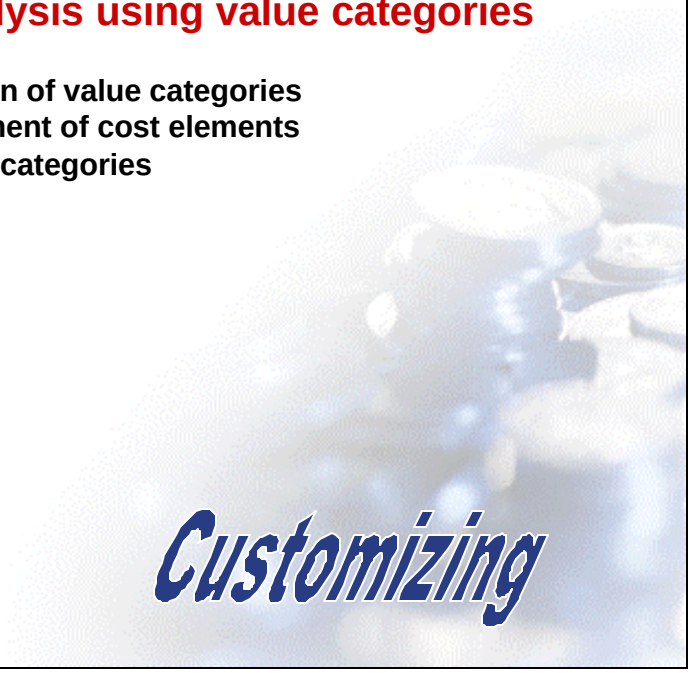
Relevant Settings



Cost analysis using value categories

- Definition of value categories
- Assignment of cost elements to value categories



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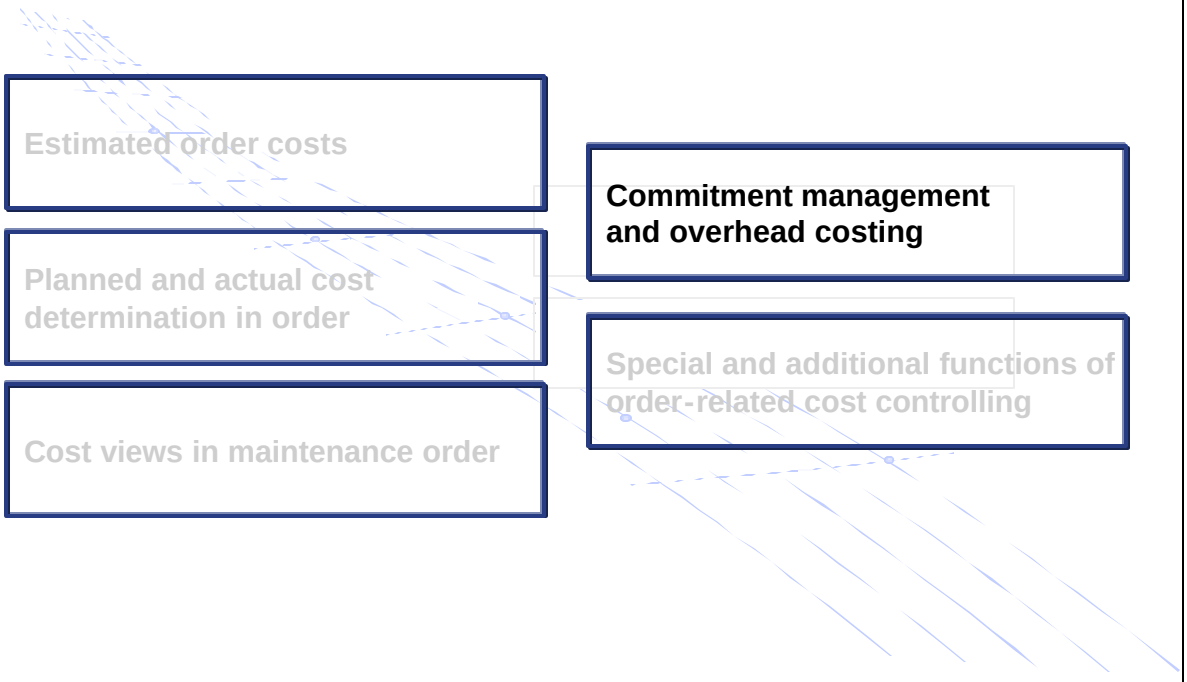
Commitments Management and Overhead Costing



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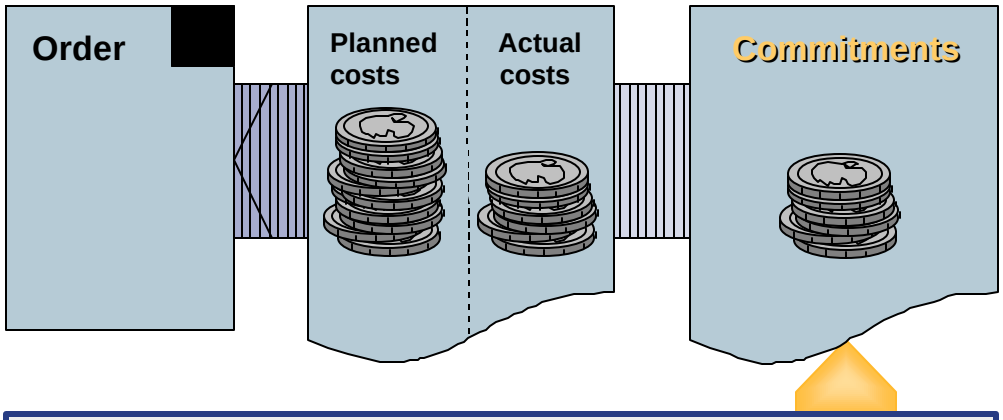
Managing Order Commitments



- **Separate value-based identification of specific resources, usually external materials and services**
- **Commitment values are administered both for order planning and execution**

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- A **commitment** refers to a contractual or up-and-coming obligation that will result in actual costs being incurred.
  The commitments management function allows you to record and analyze these obligations with regard to their cost and financial impact, for example, for purchase orders.
- The order commitment refers to the separate updating and monitoring of specific resources, particularly those which must be procured externally.
- Commitment values are updated during the planning and execution phases of the order. That is, the commitment value is influenced by both the planned costs and actual costs.
- Commitment management must be activated in Customizing for each order type.

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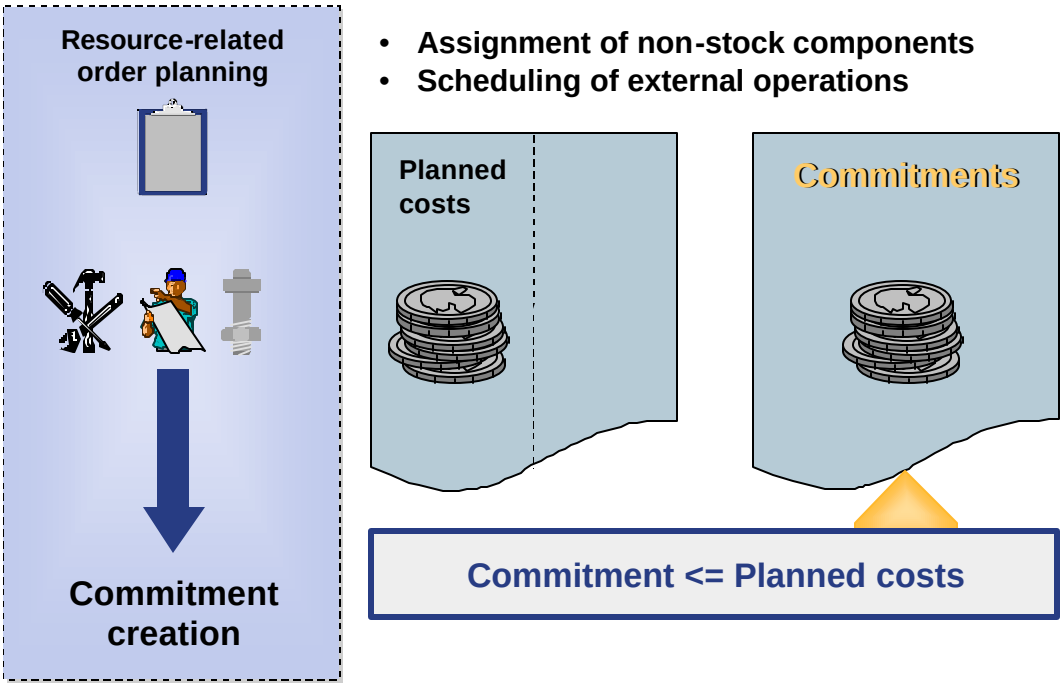
Commitment Creation



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- The value of the commitment is created based on the value of the planned resources for an order.
- Since a commitment value for internal services, for example, is not created, it may be that the commitment value is less than the planned costs for the order.

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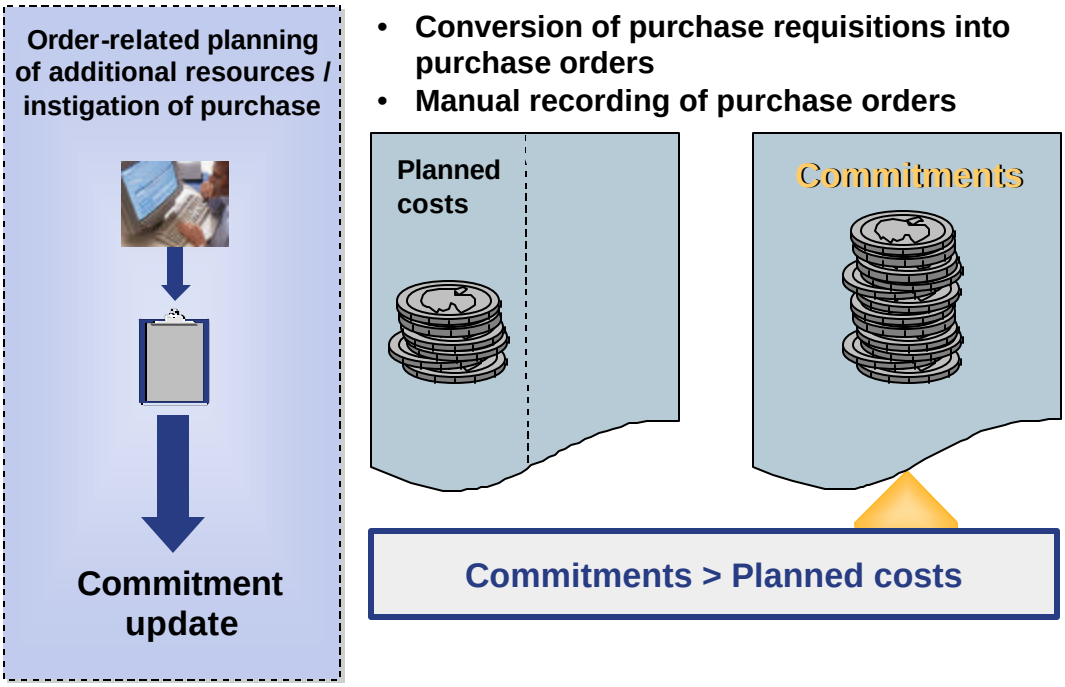
Update (or Creation) of Commitments



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- Raising the order commitment may take place as a result of activities performed outside of order processing - for example, conversion of purchase requisition to a purchase order with price increase, or manual entry of purchase requisitions assigned to orders
- This step may result in the commitment values exceeding the planned costs.

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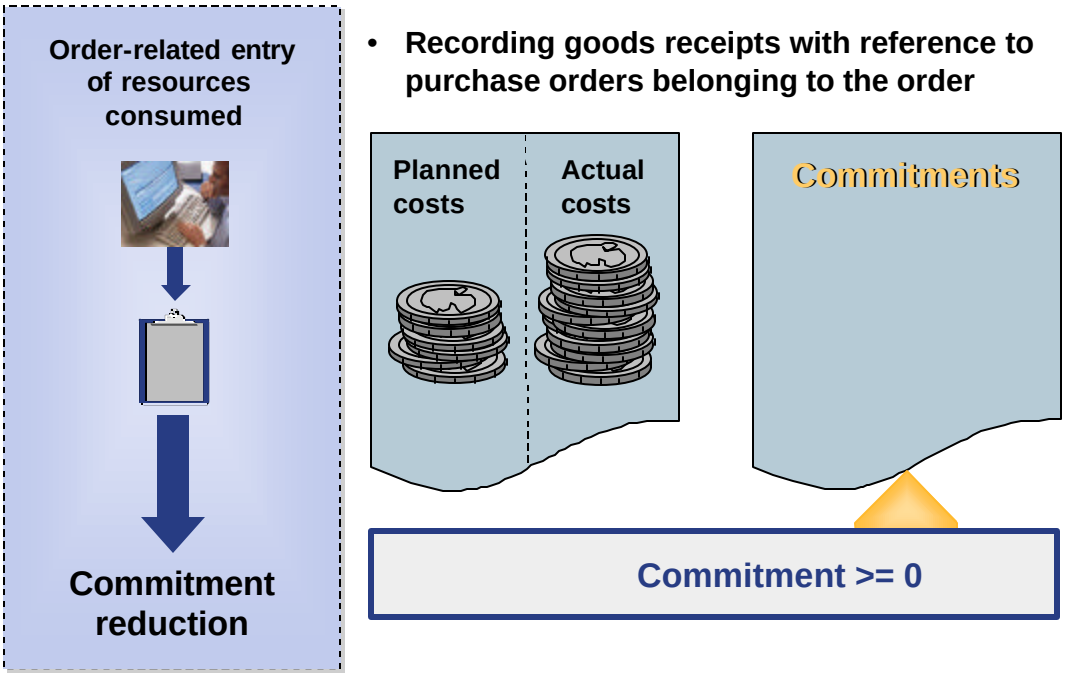
Commitment Reduction



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- The order commitment is reduced when certain planned steps are performed, for example, a receipt of goods with reference to a purchase order. The commitment values to be reduced are determined as a result of the actual costing process.
- Ideally, the order commitment is reduced to zero once all the obligations incurred through the planning process have been met.

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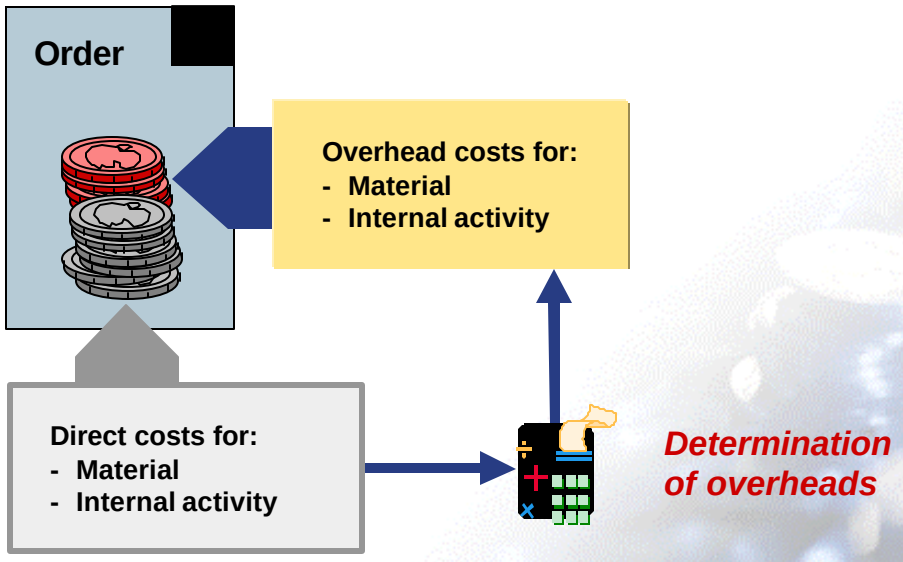
Overhead Costing



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- In addition to placing a direct value on planned or consumed resources for an order and representing these as planned or actual costs, you can also determine overheads.
- **Overheads** refer to the flat-rate, percentage or amount of the markup on direct costs that enables you to assign overhead costs for a controlling object, based on the original source of the costs.
  Overheads are levied, for example, on the costs of material cost centers, by debiting the relevant order with overheads according to the material withdrawn for an order, whilst the corresponding material cost centers are credited.
  Another common overhead is administration costs.
- Overheads enable you to charge resources, such as administration or transport, to an order even though these do not appear as separate items.
- Such overheads generate additional planned costs if they refer to planned resources. If they affect consumed resources, they represent additional actual costs and are identified as such in the order.

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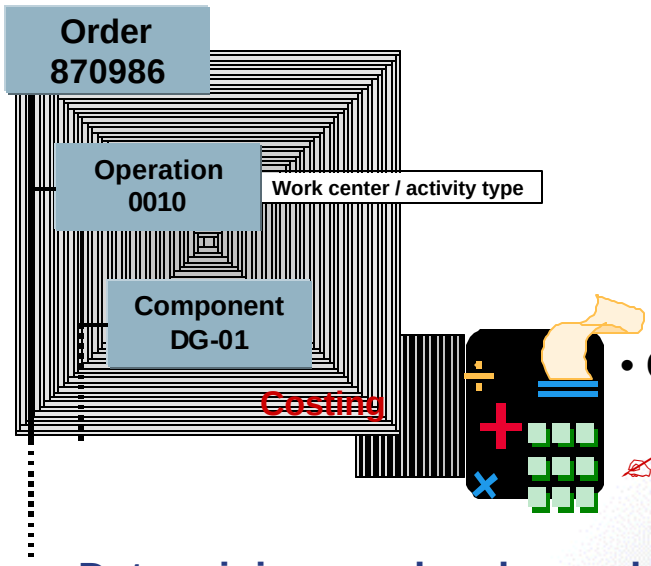
Determining Planned Overheads



- Costing variant
  Planned
- Costing sheet

Determining overheads on planned costs *is an integrated sub-function of the planned cost calculation*

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- The determination of overheads on planned costs is part of the planned cost calculation, that is, it occurs automatically when you save the order or alternatively, during order processing if an appropriate cost determination function is initiated.
- To determine overheads, a costing sheet must have been entered against the costing variant for planned costs for the appropriate order type.

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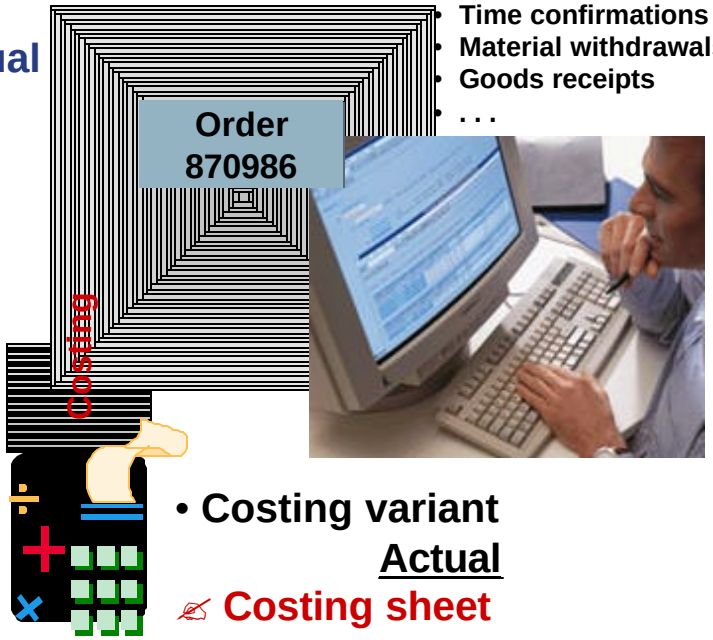
Determining Actual Overheads

- Overheads on actual costs must be determined separately



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- You can also determine overheads for actual costs if you have entered a costing sheet in the costing variant for actual costs.
- However, overheads on consumed resources are not determined automatically with each consumption posting (completion confirmation, material withdrawal, and so on), but must be determined especially. Only then is the order debited with overheads on actual costs.

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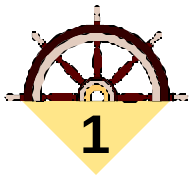
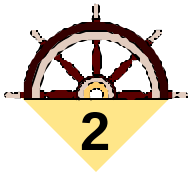
Relevant Settings



Commitments management

- Identification of order type



Defining overheads

- Assignment of a *calculation procedure*
  to the valuation variant (= part of costing variant)
  of the respective order type

Customizing

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Calculation Procedure in Detail

Costing sheet

How and for what are overheads assigned?

consists of

Basis

- Which parts of the costs are assigned overheads?
- Which cost elements are assigned overheads?

Overhead

- How much is assigned?

Credit

- How is this credited?

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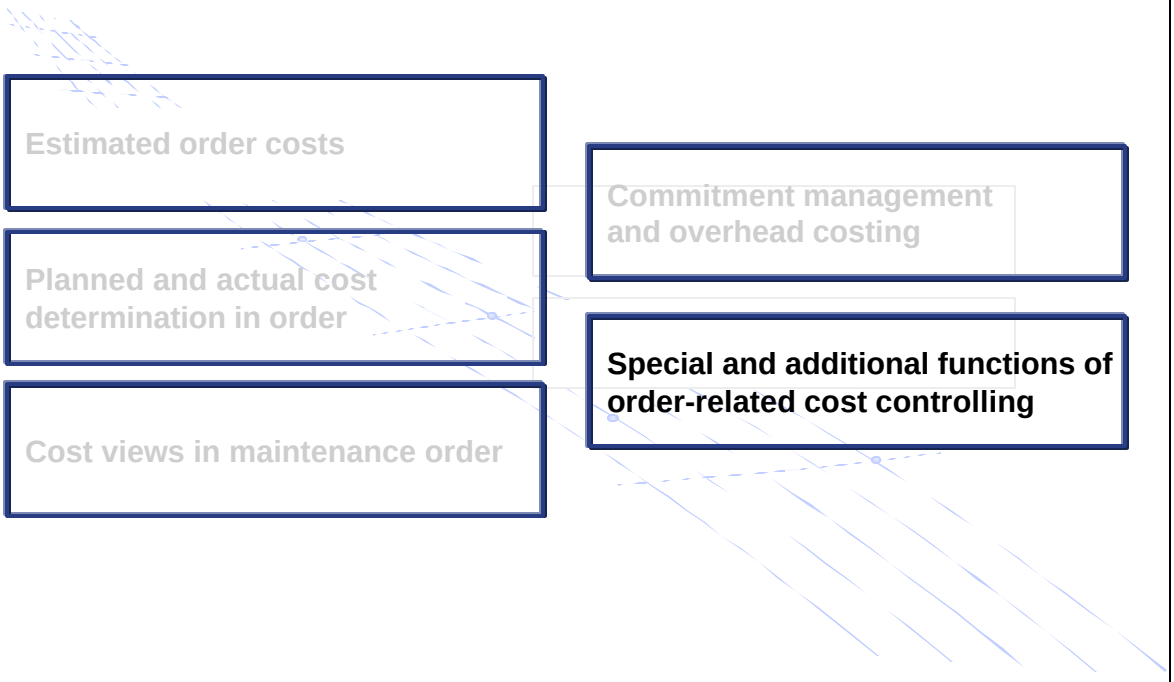
Special and Additional Functions



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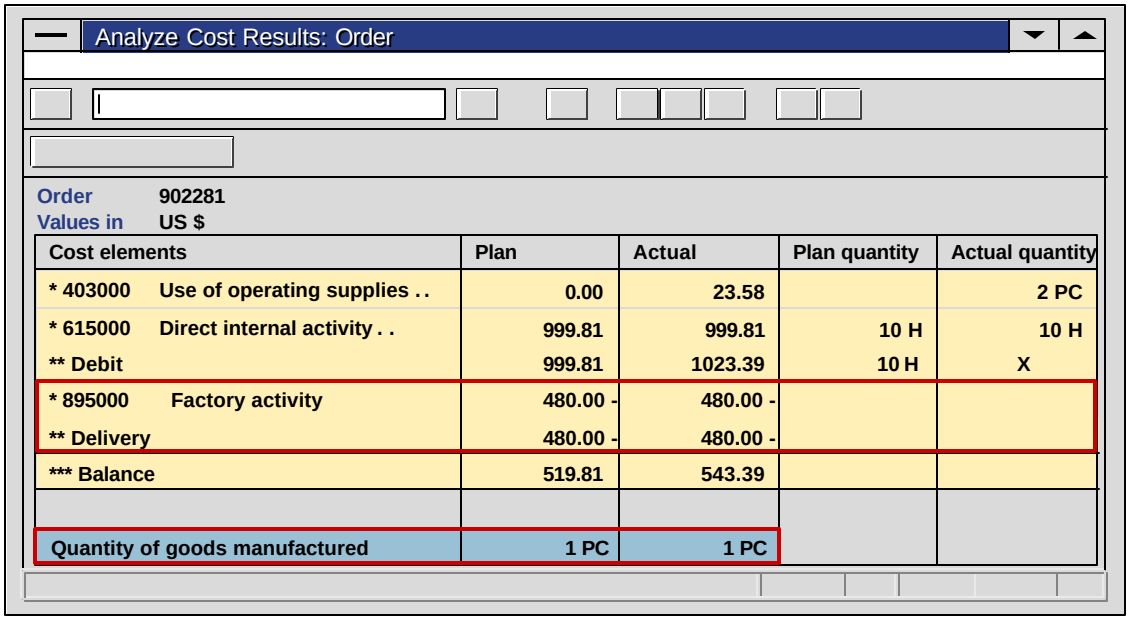

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- In the case of refurbishment, an order also identifies not only planned and actual costs, but "new values" too. These result from the refurbishment of the material "to be delivered".
- The cost report (CO report) identifies these activities as negative values under *Delivery*.

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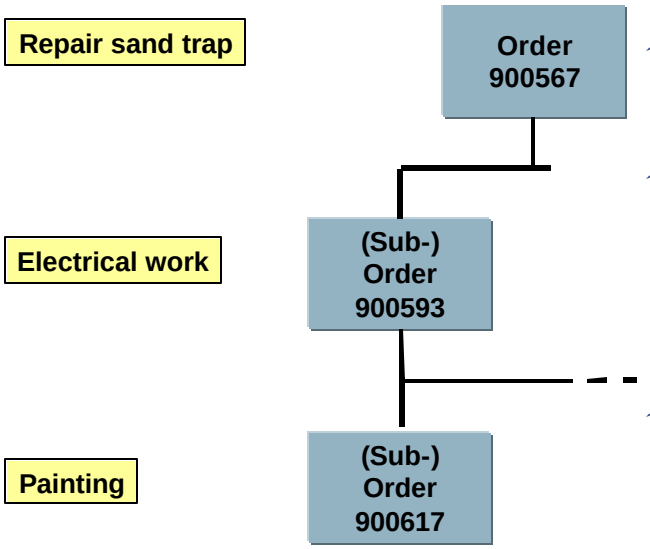
Order Hierarchies in Plant Maintenance



- **Each order is an operational element and can be used in both planning and execution**
- **Each order can have an independent assignment and control for:**
  - **Object reference**
  - **Order type**
  - **Settlement . .**
- **Cost tracking can be performed at the level of individual orders and the order hierarchy**

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- You can use order hierarchies to represent larger maintenance activities and monitor these from a cost perspective.
- There are no constraints on the use of orders here. They can have a different reference object and another settlement rule.
- Each order can also carry costs that can be monitored for the whole hierarchy using reporting.

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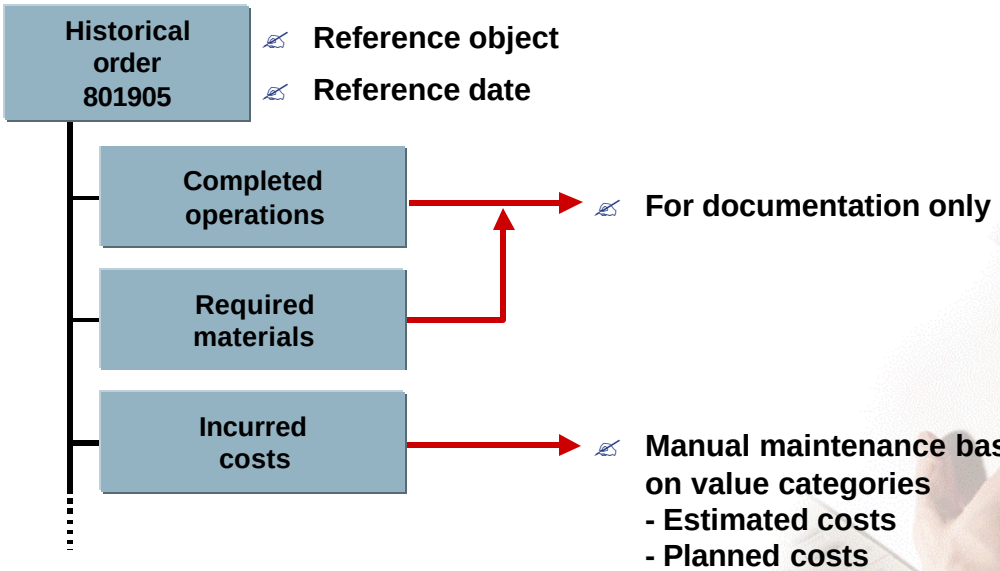
Historical Orders in Plant Maintenance



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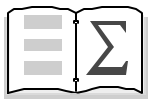
- You can use a historical order to provide documentation about work that has already been executed.
- There is no integration of the resources planned or consumed:
  - No subsequent (automatic) material withdrawals
  - No subsequent (automatic) completion confirmations
  - No values assigned to resources with the actual prices (costing)...
- Actual quantities and actual costs are entered manually in the historical orders.
- You can use the order list for direct deletion of historical orders.

Costs in the Maintenance Process: Unit Summary



You are now able to:

- **Perform a cost estimate**
- **Describe the rules and prerequisites for determining planned and actual costs**
- **Calculate overhead rates**
- **Manage commitments**
- **Use the different cost views**
- **Make the relevant settings in Customizing**

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Data Used in PM Courses

Description	Training System	IDES
General		
Controlling area:	1000	1000
Company code:	1000	1000
Plant:	1000	1000
Storage location	0001	0001
Purchasing organization	1000	1000
G/L account	417000	417000
Vendors	1000, 1101, 1102 SRV-1	1000
Technical Objects		
Equipment	TEQ-##	P-1000-N001
Equipment with synchronized serial number and synchronized material/construction type	TEX-##	-
Inspection equip ment	10003540, 10003541	10003540, 10003541
Equipment with bill of material	T-SM0100 – T-SM0120	
Configurable equipment	P-6000-N001	P-6000-N001
Functional locations	K1 ## (*) SERV-PRO-RZ-##	K1 SERV-PRO-RZ-##
Operating hours counter for FL ✍ K1-M01-2, K1-M01-3, K1-M02-2, K1-M02-3	Created in course	
Status profile for equipment	PMSTAT	

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Materials and Bills of Material		
Materials: Pump without serial number – batch standard price	T-FP1##	P-2001
Pump with serial number – batch standard price	T-FP2##	P-2002
Pump with serial number – batch moving average price	T-FP3##	P-2003
Material with serial profile PM2 (synch. equip./ser. number)	T-FP400	-
Pump without serial number – batch moving average price	T-FP9##	P-2009
Material with condition-based valuation (standard price valuation)	P-2001	P-2001
Serial number profile (stock check = 1 > warning) Synch. equip/ser. number	PM1 PM2	PM1 -
Configurable material	P-6000	P-6000
Bill of material for material P-6000	P-6000	P-6000
Materials for material BOM P-1000 (plant 1000, resp. 4)	100-100 100-400 DG-1000 100-600 100-431 KR117185 WL-1000 G-1000 M-1000	100-100 100-400 DG-1000 100-600 100-431 KR117185 WL-1000 G-1000 M-1000

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Materials for equipment BOM T-SM0100 – T-SM0120 (plant 1200, resp. 4)	DPC9021 C-1112 R-1120 R-1131 R-1160	DPC9021 C-1112 R-1120 R-1131 R-1160
Configurable material (service)	INSPECTION_SERVICE	
Work Centers		
Work Centers	T-ME## T-EL## T-EX##	Mechanics Electrics
Task Lists and Maintenance Planning		
Task lists	PUMP_WTG PUMP_REP MM-CALIB	PUMP_WTG PUMP_REP MM-CALIB
Profile	0000001	0000001
Maintenance plans Service procurement PM/QM link	50 600000000000 51, 52	50 600000000000 51, 52
Maintenance strategy: performance-based	DFL	DFL
Cycle set	ZS	ZS
Configurable general task list for maintenance plan in conjunction with configurable equipment	PUMP_WTG 6	PUMP_WTG 6 (old status)
Maintenance plan with configurable equipment and general task list	Maintenance plan 80	

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Notification and Order Processing		
Service masters	100131, 100132	100131, 100132
Order type for generating inspection lots	PM06	PM06
Control key for internal service processing	PM05	PM05
Standard text keys	PM00001 – PM00008	PM00001 – PM00008
Settlement profile for refurbishment (for order type PM04)	PM_AWA	
Order type for investment orders	PM07	
Service masters for internal service processing (control key PM05)	100020, 100021	
Cost Centers and Activity Types		
Cost centers Installed technical systems External company	 4300 4110 4350	 4300 4110 4350
Activity types	1410 (repair) 1610 (external)	1410 (repair) 1610 (external)
Allocation cost element for activity type 1610		
Outline Agreements / Framework Orders		
Outline agreement Pipe laying (vendor 1101)	 4600000024	 4600000024
Framework order for services	4500006496	4500006496
Service		
Maintenance contract	40000084	40000084
Configurable material (service)	INSPECTION_SERVICE	
Sold-to-party	1171	

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Classes		
Variant class (used in configurable equipment and general task list)	CL_P600	CL_P600
Project and Investment Program		
Project	I/5000 I/5001	I/5000 I/5001
Project profile Plant Maintenance	PM00001	PM00001
Investment Program	PM-INV	PM-INV

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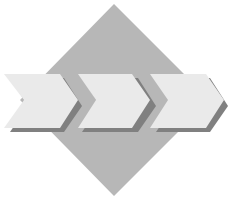
Exercises

Unit: Costs in the Maintenance Process

Topic: Estimated Order Costs

At the conclusion of these exercises, you will be able to:

- Define the cost profile for orders
- Find the cost estimate version
- Use estimated costs in the maintenance order



In order to assist decision-makers at the earliest time, IDES standard orders should have with manually assigned estimated costs.

1-1-1 Display the cost estimate version in Customizing.

How do you proceed?

What is the cost estimate version?

_____

_____

_____

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1-1-2 Display the cost profile in Customizing.

How do you proceed?

Which value categories does the cost profile contain?

_____

_____

_____

Value category	Description

1-1-3 Cost estimation

Create an order of order type PM01 directly for your equipment TEQ-##.

How do you proceed?

_____

_____

_____

Enter sufficient estimated costs for your value categories.

How do you proceed?

_____

_____

_____

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What estimated costs have you entered?

Value category	Estimated costs

What are the total estimated costs for the order?

_____

_____

_____

Save the order. What order number is assigned by the system?

_____

_____

_____

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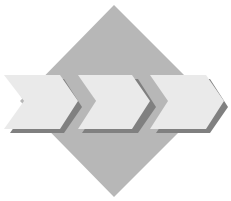
Unit: Costs in the Maintenance Process

Topic: Planned and Actual Cost Determination in Order

At the conclusion of these exercises, you will be able to:

? Perform planned and actual cost calculation

? Find the relevant settings for costing, such as the costing variant, valuation variant and order-specific calculation parameters



During the planning phase for a maintenance order, a cost situation should be displayed in the form of planned costs, which are calculated based on the scheduled resources.

The consumption of resources should be recorded using actual costs.

1-2-1 Planning an order

Change your order and perform order planning.

How do you proceed?

_____

_____

_____

Plan at least one operation with control key PM01 and assign TEQ-## to it as a stock component from the bill of material for your equipment.

How do you proceed?

Operation planning

_____

_____

_____

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Material assignment

_____

_____

_____

Put the order in process.

How do you proceed?

_____

_____

_____

1-2-2 Executing an order

Enter a completion confirmation of time for your order.

How do you proceed?

_____

_____

_____

1-2-3 Withdraw the planned material for your order with reference to the reservation.

How do you proceed?

_____

_____

_____

1-2-4 Determining the rules for the planned cost estimate

Use the Customizing function, relevant order and other data to check the determination of planned costs for the order.

Which Customizing settings are relevant for the planned cost estimate?

_____

_____

_____

Which other data are relevant for the calculation:

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With internal activity

_____

_____

_____

With stock components

_____

_____

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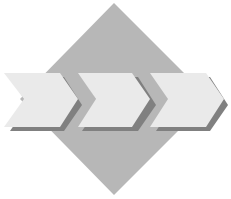
Unit: Costs in the Maintenance Process

Topic: Cost Views in Maintenance Order

At the conclusion of these exercises, you will be able to:

? Use cost reports in the order

? Assign cost elements to value categories



During the planning and execution of the maintenance order, it should be possible to display the cost situation transparently at any time.

The data can be displayed according to the relevant value categories or cost elements.

1-3-1 Analyzing order costs

Display the planned and actual costs for your order according to value categories.

How do you proceed?

_____

_____

_____

What are the planned and actual costs for the order?

Value category	Planned costs	Actual costs

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1-3-2 Display the planned and actual costs (debit) for your order by cost element.

How do you proceed?

_____

_____

_____

What are the planned and actual costs for the order?

Cost element	Plan	Actual

1-3-3 Checking the assignment of cost elements to value categories

How are cost elements assigned to value categories?

_____

_____

_____

Which value category is derived from which cost element?

Cost element	Value category

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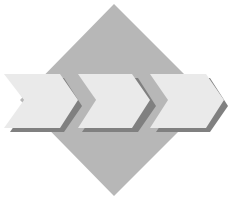
Unit: Costs in the Maintenance Process

Topic: Commitments Management

At the conclusion of these exercises, you will be able to:

? Use commitment management

? Make the necessary settings



At IDES, services and materials are often procured externally. The legal obligation, entered into with the vendor following the purchase, should be assigned to the order as a commitment.

1-4-1 Activating Commitments Management

Check in Customizing whether commitments management is active for the order type used by you. How do you proceed?

_____

_____

_____

1-4-2 Planning an order

Enter an order with order type PM01 and plan an operation with control key PM02 and operation quantity 2 AU (activity units), then enter a valuation price.

How do you proceed?

_____

_____

_____

1-4-3 Release the order and save the changes. How do you proceed?

_____

_____

_____

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1-4-4 Checking a Commitment Value

Check whether a commitment value is assigned for your order.

How do you proceed?

What commitment is displayed?

_____

_____

_____

1-4-5 Executing an order

Enter a purchase order for 1 AU (activity unit) for your order and then check the commitment value.

How do you proceed?

Which purchase order number is assigned?

What commitment is displayed?

_____

_____

_____

1-4-6 Enter a goods receipt for 1 AU for your order.

How do you proceed?

Which document number is assigned?

_____

_____

_____

1-4-7 Checking a Commitment Value

Check the current commitment value assigned to your order.

Which path do you choose?

_____

_____

_____

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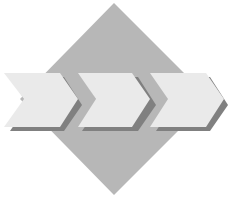
Unit: Costs in the Maintenance Process

Topic: Overhead Costing

At the conclusion of these exercises, you will be able to:

? Perform overhead costing

? Make the necessary settings



At IDES, the general costs (warehouse, SD, plant maintenance etc.) are transferred proportionally to the maintenance orders. This enables the costs incurred to be transferred to the requester.

1-5-1 Check the calculated overhead rates for the order created above.

How do you proceed?

Which overheads have been calculated automatically?

_____

_____

_____

1-5-2 Plan an additional, internally processed operation in your order with standard time of one hour.

How do you proceed?

Perform a cost determination. Which overheads are calculated automatically?

_____

_____

_____

1-5-3 Determining and Checking Actual Overheads

Perform an actual overhead determination for your order.

How do you proceed?

_____

_____

_____

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1-5-4 Use the cost report to check whether overheads are assigned for actual costs.

How do you proceed?

_____

_____

_____

1-5-5 Determining the Rules for Overhead Costing

Use the Customizing function, relevant order and other data to determine the overheads for planned costs in the order.

Which Customizing settings are relevant for determining overheads?

_____

_____

_____

1-5-6 Which cost element is marked with “apply overhead” in the above order?

_____

_____

_____

1-5-7 Use the example of an internal activity to display schematically how overheads are determined.

_____

_____

_____

_____

_____

_____

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Unit: Costs in the Maintenance Process

Topic: Estimated Order Costs

1-1-1 ***SAP menu*** *?* ***Tools*** *?* ***Customizing*** *?* ***IMG*** *?* ***Edit Project***

SAP Reference IMG button

Plant Maintenance and Customer Service *?* ***Maintenance and Service Processing*** *?* ***Basic Settings*** *?* ***Settings for Display of Costs*** *?* ***Define Version for Cost Estimates for Orders***

Cost estimate version: 6 Cost estimate Maint. Orders

1-1-2 ***Plant Maintenance and Customer Service*** *?* ***Maintenance and Service Processing*** *?* ***Basic Settings*** *?* ***Settings for Display of Costs*** *?* ***Define Default Values for Value Categories***

Value category	Description
400	Internal material / Spares
415	Material – Direct reference
417	External Services
615	Internal Labor
800	Revenues
890	Spare parts (own production)
999	Miscellaneous

1-1-3 ***SAP menu*** *?* ***Logistics*** *?* ***Plant Maintenance*** *?* ***Maintenance Processing*** *?* ***Order*** *?* ***Create (General)***

Field Name or Data Type	Values
Order type:	PM01
Equipment	TEQ-##

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Costs tab page

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Unit: Costs in the Maintenance Process

Topic: Planned and Actual Cost Determination in Order

1-2-1 ***SAP menu*** *?* ***Logistics*** *?* ***Plant Maintenance*** *?* ***Maintenance Processing*** *?* ***Order*** *?* ***Change***

Operation planning: *Operations tab page*

Field Name or Data Type	Values
Work center:	T-MExx
Control key	PM01
Activity type	1410

Material planning: *Double click on the operation, Components tab page, List button*

For example, 100-400, 100-431, 100-600

Put in process: *Put in process button*

1-2-2 Time confirmation:

SAP menu *?* ***Logistics*** *?* ***Plant Maintenance*** *?* ***Maintenance Processing*** *?* ***Completion Confirmation*** *?* ***Entry*** *?* ***Individual Time Confirmation or Collective Time Confirmation*** *?* ***With Selection***

1-2-3 Material withdrawal:

SAP menu *?* ***Logistics*** *?* ***Plant Maintenance*** *?* ***Maintenance Processing*** *?* ***Completion Confirmation*** *?* ***Goods Movement*** *?* ***Goods Movement***

Field Name or Data Type	Values
Movement type	261
Plant	1000
Storage location	0001

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1-2-4 ***SAP menu ? Tools ? Customizing ? IMG ? Edit Project***

SAP Reference IMG button

Plant Maintenance and Customer Service ? Maintenance and Service Processing ? Maintenance and Service Orders ? Functions and Settings for Order Types ? Costing Data for Maintenance and Service Orders ? Assign Costing Parameters and Results Analysis Keys

Select line with plant 1000 and order type PM01

Goto - Detail

Planned costing variant PM01

Actual costing variant PM01

Back out to Reference IMG

*? **Maintain Costing Variants***

Click on Details button

Valuation variant PM01

Back out to Reference IMG

*? **Define Valuation Variants***

Select line with valuation variant PM0 (maintenance order)

Click on Details button

Activity Types/Process tab

Strategy 1 Planned activity price for period

Other necessary entries:

Material val. Tab

Strategy 7 Valuation price based on price control in material master

Material val. Tab

Required quantity of component

Relevancy to costing = 'X' (component detail screen)

Price in material master (View: Financial Accounting 1)

Material val. Tab from bill of material

Relevancy to costing = 'X' of BOM item must be set

Activity Types/Process tab

Work in the operation

Activity type in the operation

Control key with costing = 'X' (Customizing of control keys)

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Unit: Costs in the Maintenance Process

Topic: Cost Views in Maintenance Order

1-3-1 ***SAP menu*** *?* ***Logistics*** *?* ***Plant Maintenance*** *?* ***Maintenance Processing*** *?* ***Order*** *?* ***Change***

Cost analysis based on value categories:

Cost overview tab page

1-3-2 Cost analysis based on cost elements:

Plan/actual report button in the cost overview based on value categories

or ***Extras - Cost reports - Plan/actual comparison***

1-3-3 ***SAP menu*** *?* ***Tools*** *?* ***Customizing*** *?* ***IMG*** *?* ***Edit Project***

Select a value category line and click on the *Details* button.

SAP Reference IMG button

Plant Maintenance and Customer Service *?* ***Maintenance and Service Processing*** *?* ***Basic Settings*** *?* ***Settings for Display of Costs*** *?* ***Assign Cost Elements to Value Categories***

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Unit: Costs in the Maintenance Process

Topic: Commitments Management

1-4-1 ***SAP menu*** *?* ***Tools*** *?* ***Customizing*** *?* ***IMG*** *?* ***Edit Project***

SAP Reference IMG button

Plant Maintenance and Customer Service *?* ***Maintenance and Service Processing*** *?* ***Maintenance and Service Orders*** *?* ***Functions and Settings for Order Types*** *?* ***Configure Order Types***

Select line with order type PM01

Goto *?* ***Detail***

1-4-2 ***SAP menu*** *?* ***Logistics*** *?* ***Plant Maintenance*** *?* ***Maintenance Processing*** *?* ***Order*** *?* ***Create (General)***

Order entry

Order type:	PM01
Equipment:	TEQ-##

Operation planning

Control key:	PM02
Operation quantity:	2 AU
Price:	

1-4-3 Order – Functions - Release

Order – Save

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1-4-4 ***SAP menu ? Logistics ? Plant Maintenance ? Maintenance Processing ? Order ? Display***

Extras ? Cost reports ? Budget/commitments

List: Budget/actual/commitment

Commitments: _____

The commitment of the purchase requisition is displayed;

double-click on the commitment value

>>***Orders Line items Commitments***

>>The list displays the value and quantity of the commitment as well as the number of the reference document (here: purchase requisition number)

1-4-5 ***SAP menu ? Logistics ? Materials Management ? Purchasing ? Purchase Order ? Create ? Vendor/Supplying Plant Known***

Using the symbol for selection variants, select the option *My purchase requisitions*;

Then use the symbol *Adopt* to copy the purchase requisition to the work area (right hand area of the screen).

Field Name or Data Type	**Values**
Vendor	1000
Purchasing organization	1000
Purchasing group	008
Company code	1000
Purchase requisition	From order
Quantity	1 AU

The value of the commitment has not changed in the order, although it is now distributed over two documents (order and purchase requisition). This means that there is a binding order commitment and a purchase order commitment.

See also ***Orders Line items Commitments*** (as in 1-4-4)

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1-4-6 ***SAP menu ? Logistics ? Materials Management ? Purchasing ? Purchase Order ? Follow-On Functions ? Goods Receipt***

Use the selection fields to choose *Goods receipt* and *Purchase order*. Then enter the purchase order number and confirm the entry.

Set the indicator *Item OK* in the detailed data (the lower screen area), then save.

1-4-7 ***SAP menu ? Logistics ? Plant Maintenance ? Maintenance Processing ? Order ? Display***

Extras ? Cost reports ? Budget/commitments

List: Budget/actual/commitment

Commitments: _____

The commitment is completely broken down, according to the goods receipt quantity of the purchase order quantity. (This is not the case here). If the goods receipt quantity is smaller than the purchase order quantity, the difference between goods receipt and purchase order is retained in the order as a commitment (here as a purchase order commitment).

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Unit: Costs in the Maintenance Process

Topic: Overhead Costing

1-5-1 ***SAP menu*** *?* ***Logistics*** *?* ***Plant Maintenance*** *?* ***Maintenance Processing*** *?* ***Order*** *?* ***Change***

Costs tab page

Overhead costs have been calculated automatically for planned costs.

1-5-2 Enter time and description in the order, *operation list* tab page, control key PM01.

Then *Determine costs* button (calculator symbol);

Return to the cost overview using *Costs* tab page; overheads have been re-determined for the planned costs that are cumulated in the value category “Overhead costs”.

1-5-3 ***SAP menu*** *?* ***Logistics*** *?* ***Plant Maintenance*** *?* ***Maintenance Processing*** *?* ***Completion*** *?* ***Individual Processing*** *?* ***Determine Actual Cost Surcharges***

Enter order number and period (= current month) and fiscal year, then execute.

Remove test run indicator.

1-5-4 ***SAP menu*** *?* ***Logistics*** *?* ***Plant Maintenance*** *?* ***Maintenance Processing*** *?* ***Order*** *?* ***Change***

Costs tab page

1-5-5 The relevant parameter for calculating overheads is the **costing sheet**, which is assigned to the order type as part of the **costing variant**.

SAP menu *?* ***Tools*** *?* ***Customizing*** *?* ***IMG*** *?* ***Edit Project***

SAP Reference IMG button

Plant Maintenance and Customer Service *?* ***Maintenance and Service Processing*** *?* ***Maintenance and Service Orders*** *?* ***Functions and Settings for Order Types*** *?* ***Costing Data for Maintenance and Service Orders*** *?* ***Assign Costing Parameters and Results Analysis Keys***

Order type PM01 in planning plant 1000

>> Calculation variant PM01 is assigned to the order type.

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Plant Maintenance and Customer Service ? Maintenance and Service Processing ? Maintenance and Service Orders ? Functions and Settings for Order Types ? Costing Data for Maintenance and Service Orders ? Maintain Costing Variants

Costing variant PM01 consists of a costing type *Maintenance order* and a valuation type *Maintenance order.*

Plant Maintenance and Customer Service ? Maintenance and Service Processing ? Maintenance and Service Orders ? Functions and Settings for Order Types ? Costing Data for Maintenance and Service Orders ? Maintain Costing Variants.

Valuation variant *Maintenance order* with key PM0

The valuation variant contains the valuation strategies for the individual resources in the order.

Overhead tab page

>> The valuation variant has a *COPM* costing sheet

Plant Maintenance and Customer Service ? Maintenance and Service Processing ? Maintenance and Service Orders ? Functions and Settings for Order Types ? Costing Data for Maintenance and Service Orders ? Maintain Costing Sheets

Select costing sheet with key COPM and double-click on costing sheet rows on left side of screen

This contains the bases for calculation

PMEL (Activity Types/Process tab),

PMMT (internal material)

PMFR (external service/material)

as well as the respective overhead lines ELZU, MTZU and FRZU

1-5-6

Field Name or Data Type	Values
Cost element 417000	Calculation basis PMFR Overhead FRZU =20 % for planned and actual overheads
Cost element 615000	Calculation basis PMEL Overhead ELZU =10 % for planned and actual overheads

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1-5-7 Cost Element 615000 for Activity Types/Process tab in Order

Order type	>> Costing variant
Costing variant	>> Valuation variant
Valuation variant	>> Costing sheet
Costing sheet	>> Calculation basis PMEL for cost element 615000
	>> Overhead ELZU for basis PMLE = 10 %

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Settlement of Orders

- Order settlement overview
- Settlement of object-based preventive maintenance, inspections and repairs
- Interplay:
  Order settlement – Order completion
- Settlement of refurbishment orders

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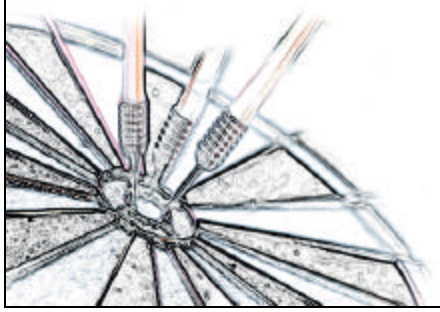
Settlement of Orders: Course Objectives

At the conclusion of this unit, you will be able to:

- **Settle a standard order**
- **Make the relevant settings in Customizing**
- **Settle a refurbishment order**



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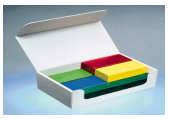
Course Overview Diagram

Course Overview

Settlement of Orders



Introduction

Budgeting and Cost Planning

Costs in maintenance process

Business Intelligence

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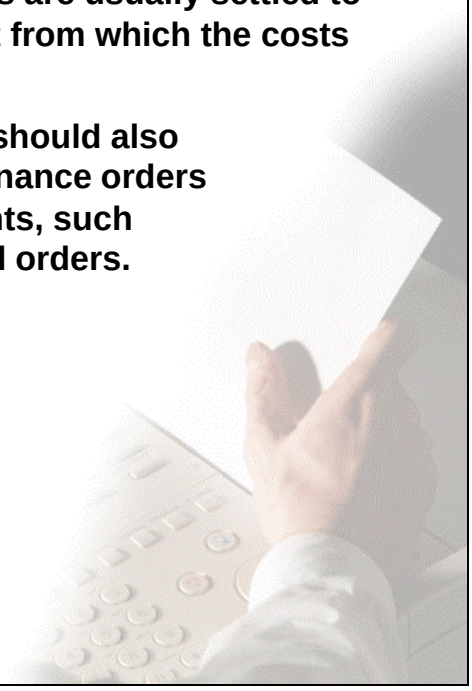
Business Scenario

- At IDES, maintenance orders are usually settled to the cost center of the object from which the costs originated.
- However, in some cases, it should also be possible to settle maintenance orders to other account assignments, such as WBS elements or internal orders.



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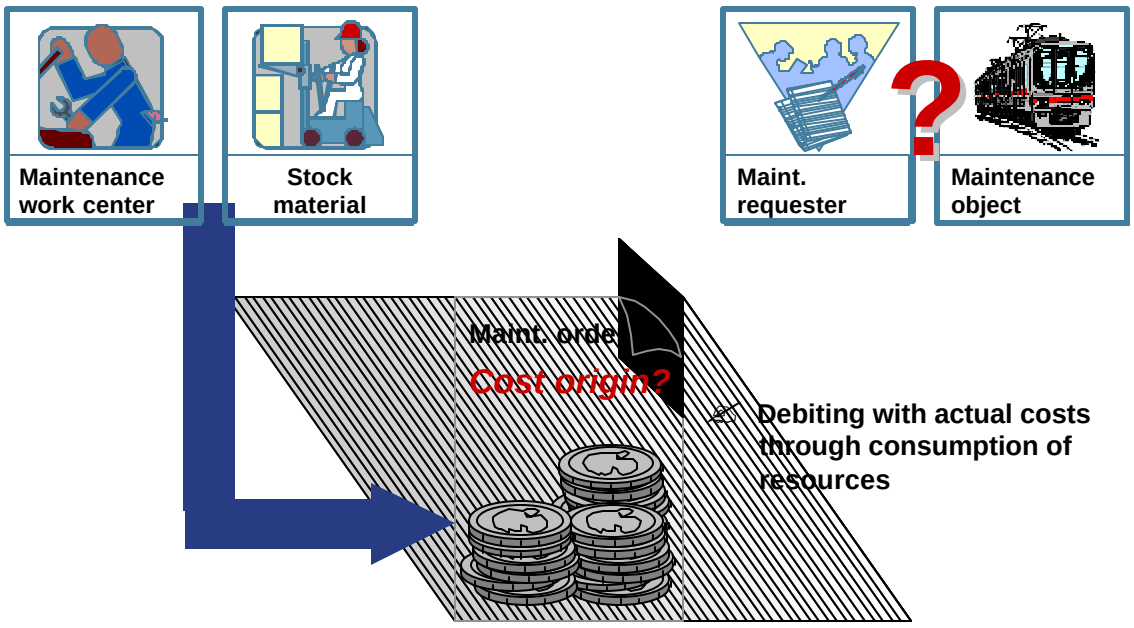
Order Settlement Overview: Motivation



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- You can use the maintenance order as an instrument for planning and executing maintenance work. This means that the order initially bears all the costs that result from the planning and consumption of resources.
- The costs generated by consuming the resources required appear on the debit side of the order as actual costs.
- You should answer the following questions in order to ensure that cost allocation and tracking adhere to the allocation-by-cause principle:
  - Is the order really the originator of the costs?
  - What is the role of the maintenance object or maintenance requester?

  This is the basis of order settlement.

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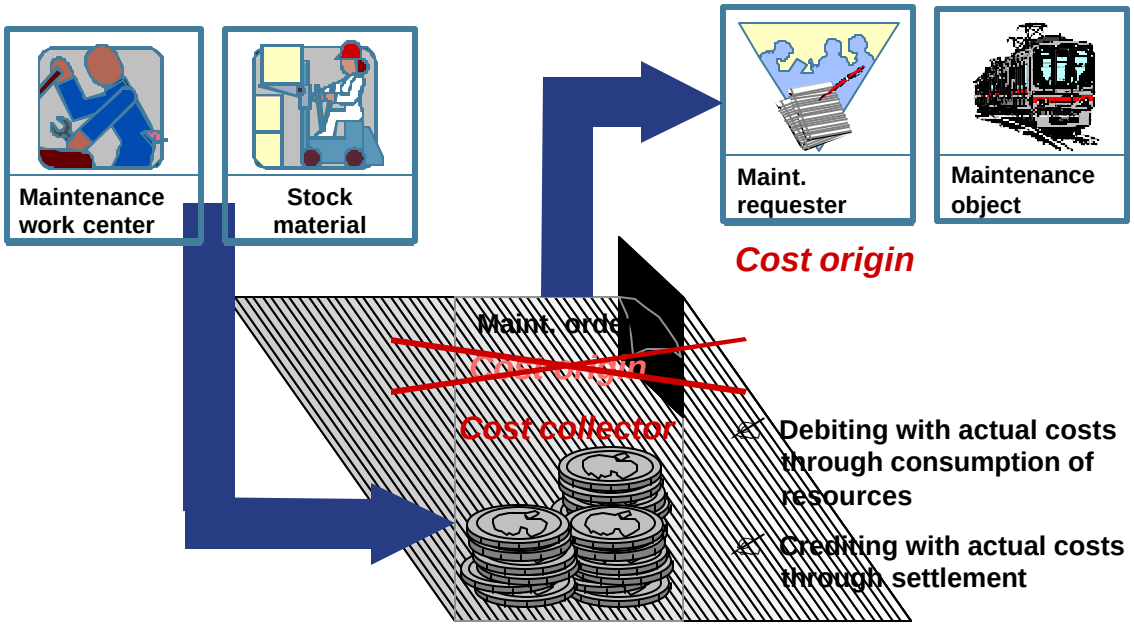
Order Settlement Overview: Process Flow



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- Depending on the type of task, the order is settled to its actual originator and credited with the costs of resources consumed.
- Order costs are borne by another receiver which is also a cost accounting object. This may, for example, be the cost center of the maintenance object or the organizational unit that requested this work to be executed.
- The order is therefore merely a "collector" of all costs incurred during the planning and execution phases with the purpose of tracking them from a cost-related perspective.

Settlement of Maintenance Tasks

Order settlement overview

Interplay:
Order settlement –
Order completion

Settlement of Object-Based Preventive Maintenance, Inspections and Repairs

Settlement of
refurbishment orders

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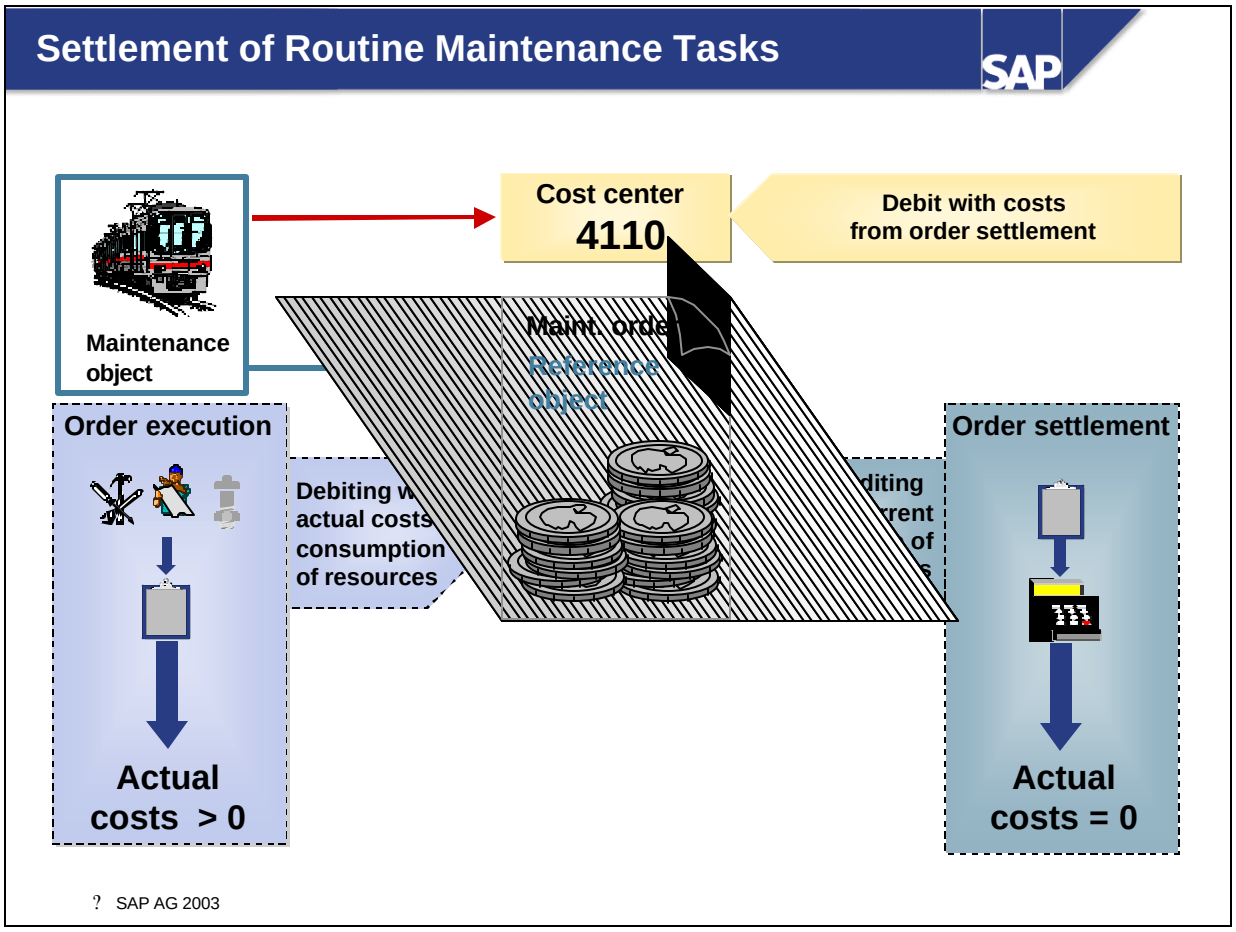

- The "routine" maintenance tasks that arise through the technical administration of a specific maintenance object are generally settled to the cost center of this object.
- To do this, the corresponding cost center must have been specified as the receiver in the settlement rule for the order.
- The actual costs for the order are passed on to the cost center which is debited. At the same time these costs are credited to the order.
- The balance of actual costs for the order after complete settlement equals zero whilst the actual cost on the cost center is greater than zero.

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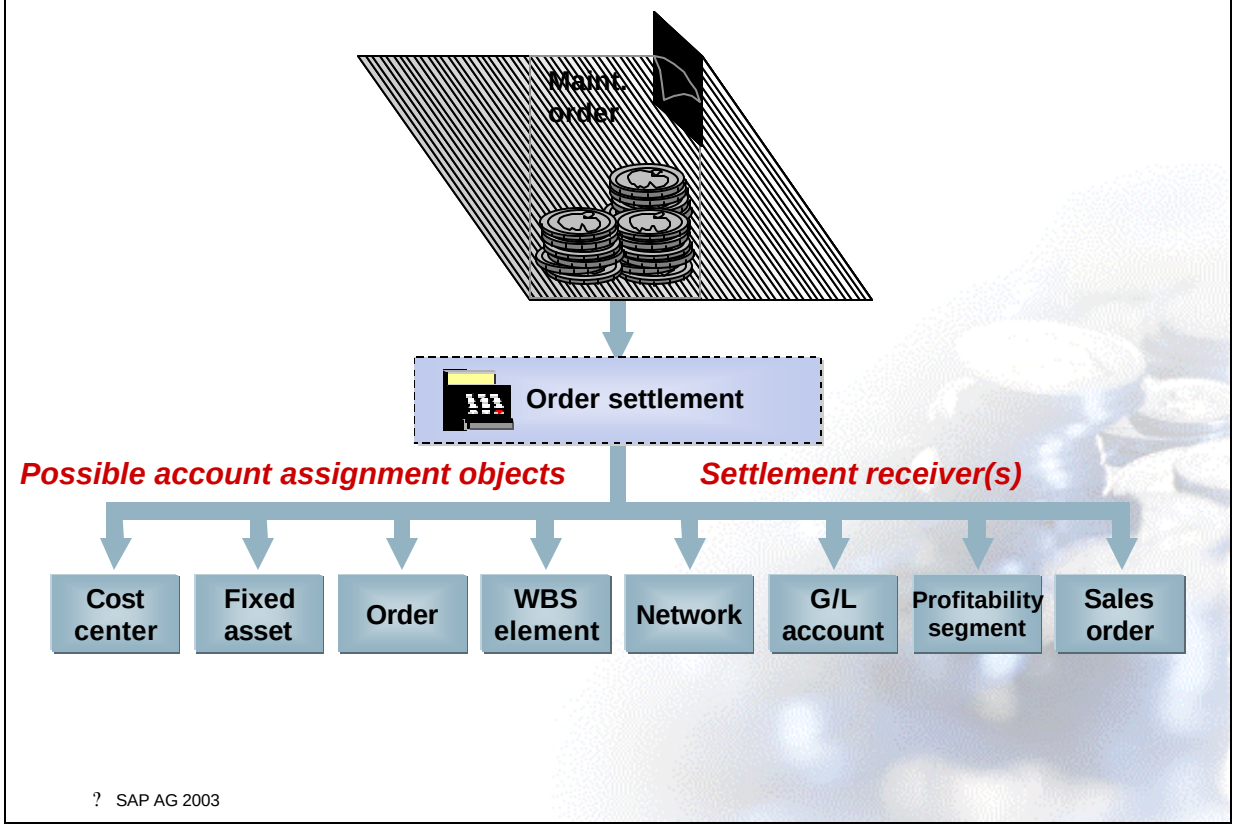
Account Assignment Objects in Order Settlement



- There are other possible settlement receivers in addition to the cost center. Generally, this depends on the type of task performed.
- Tasks of an investment nature that simultaneously improve the value of the asset could be settled to an asset within asset accounting, and larger tasks, such as shutdown projects, could be settled to the relevant WBS element.
  This is governed by the specific settlement rule for the order.

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Order-Specific Settlement Rules

Settlement rule is valid for the whole order

consists of

Distribution rule(s)

- Which rule is valid for which settlement type?
- To which receiver should settlement be made?
- What percentage of the actual costs should be settled?

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- The settlement rule is fixed for the whole order, since the order as a whole is the object of the cost tracking process.
- The settlement rule specifies the receiver of the actual costs for an order.

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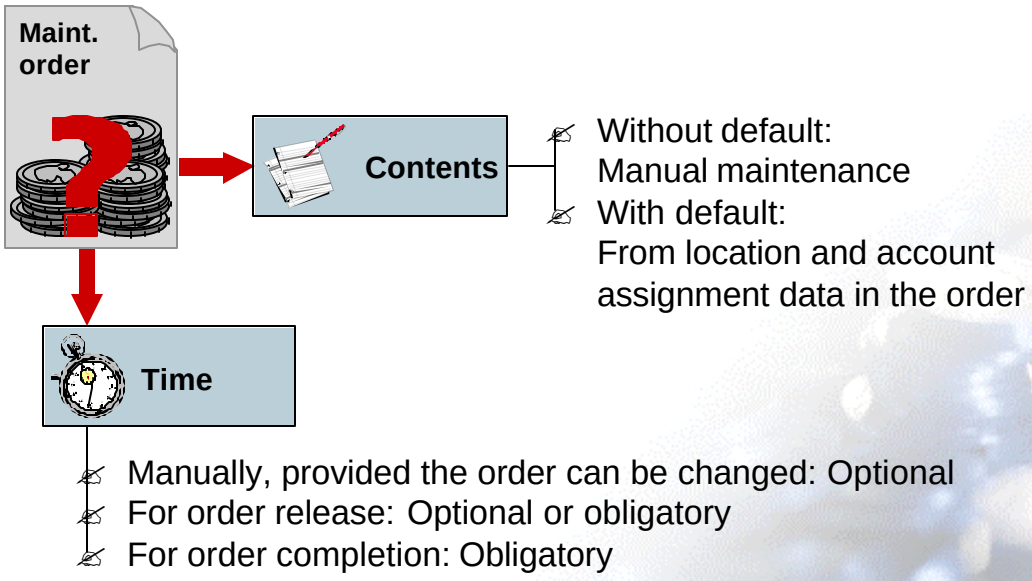
Creating a Settlement Rule



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- You can create a settlement rule automatically or manually, and with or without a default value from the system.
- A settlement rule must be created on technical completion of the order at the latest.
- Although you usually only define a settlement rule once during order processing, the settlement itself is a separate process that can be repeated many times.

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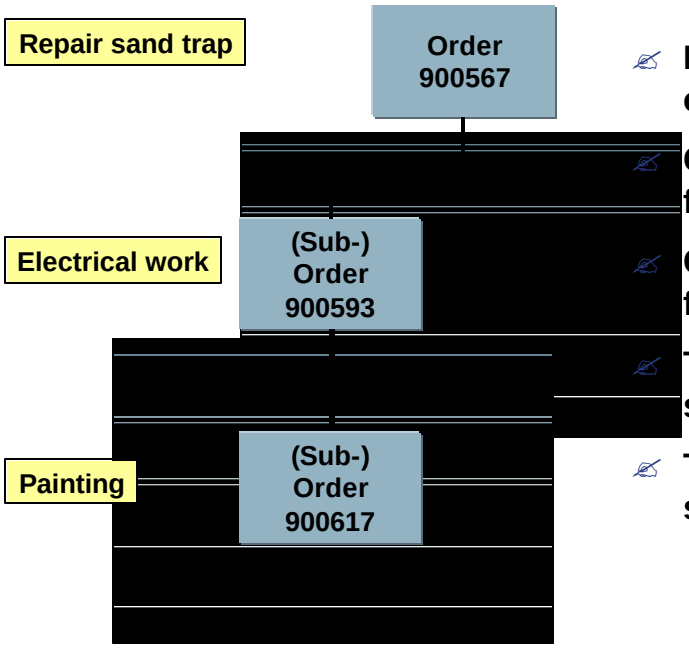
Settlement Rule for Sub-Orders



- No special settings for sub-orders
- Copying of distribution rule(s) for main order
- Copying of distribution rule(s) for superior order
- Transfer of main order as settlement receiver
- Transfer of superior order as settlement receiver

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- You use the order type in Customizing to define how the settlement rule should be determined for sub-orders. The account assignment proposal, which has been maintained in the settlement profile, is thereby overridden for sub-orders.
- You can choose between the following settings:
  - Copying the distribution rule(s) for the main order
  - Copying the distribution rule(s) for the superior order
  - Transfer of main order as settlement receiver
  - Transfer of superior order as settlement receiver
  - No special settings for sub-orders
- If settlement to the main order or superior order is set for an order type (if you are using it as a sub-order), the system automatically creates a **settlement hierarchy**. The lowest level order is assigned the highest priority. This means it is settled first before any other orders. The main order is assigned the lowest priority level and is settled last.
- This ensures that settlement is always complete, and that it takes place in the correct order.
- You can also create settlement hierarchies manually (see CO documentation).

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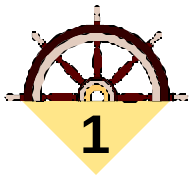
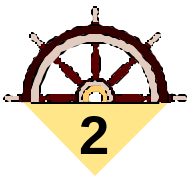
Relevant Settings



Order settlement

- Assignment of a settlement profile to the order type



Time when settlement rule created

- Definition of time for each order type

Settlement rule for sub-orders

- Definition of settlement receiver for sub-orders

Customizing

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Settlement Profile in Detail

Settlement profile — How to settle, and to where?

- determines
  - If and how settlement is made?
  - To which receiver types can settlement be made?
  - Which receiver category should be proposed?
- proposes
  - Assignment from original to settlement cost elements

Allocation structure

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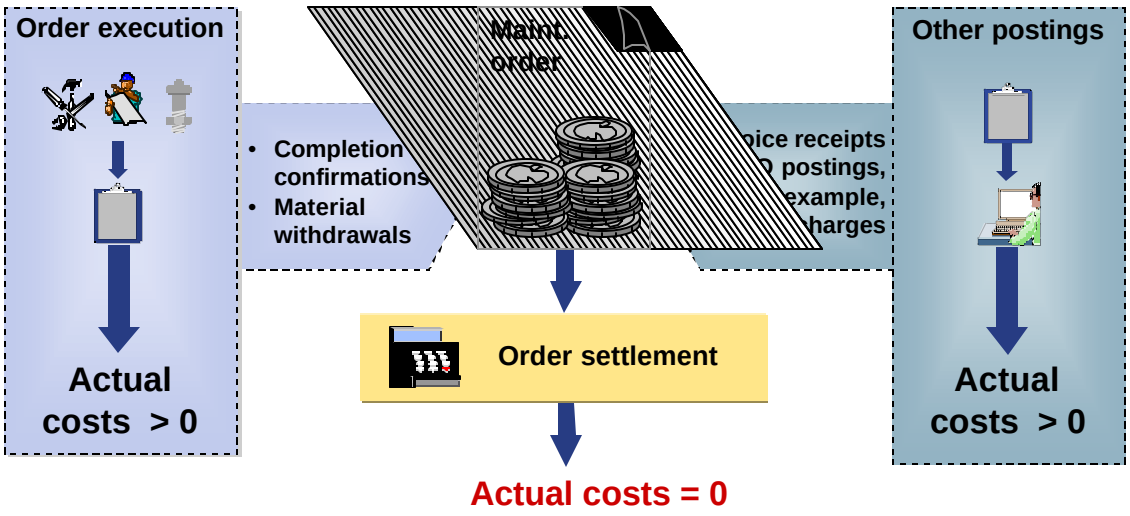
Order Debits After Settlement



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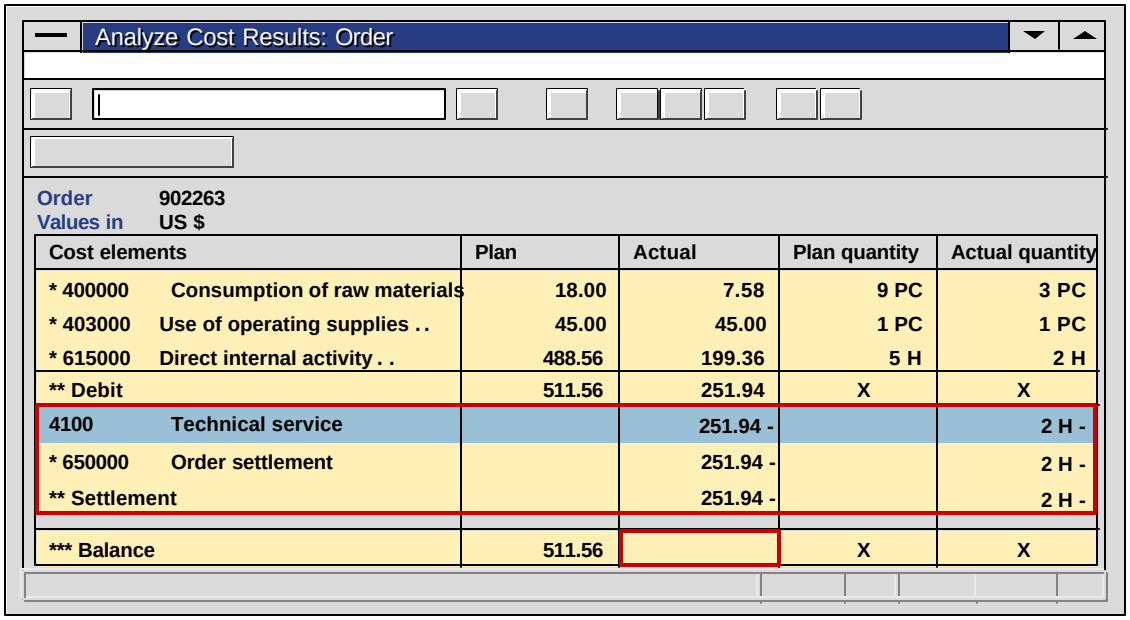
- A fully settled order can be further debited by actual costs. This is particularly the case for orders that extend over a number of posting periods.
- This means that the balance of actual costs for the order is once again greater than zero, and can be returned to zero with another settlement.
- The system allows you to perform a settlement, so long as you have not fully completed the order.

Detailed Cost Analysis with CO Report



Cost elements		Plan	Actual	Plan quantity	Actual quantity
* 400000	Consumption of raw materials	18.00	7.58	9 PC	3 PC
* 403000	Use of operating supplies . .	45.00	45.00	1 PC	1 PC
* 615000	Direct internal activity . .	488.56	199.36	5 H	2 H
** Debit		511.56	251.94	X	X
4100	Technical service		251.94 -		2 H -
* 650000	Order settlement		251.94 -		2 H -
** Settlement			251.94 -		2 H -
*** Balance		511.56		X	X

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- Following settlement, the order is credited with the actual settled costs. This is shown in the cost report (CO report) for the order.
- An order is fully settled when the sum of the actual costs equals zero.

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Order Settlement and Order Completion

Order settlement overview

Interplay:
Order settlement –
Order completion

Settlement of Object-Based Preventive Maintenance, Inspections and Repairs

Settlement of refurbishment orders

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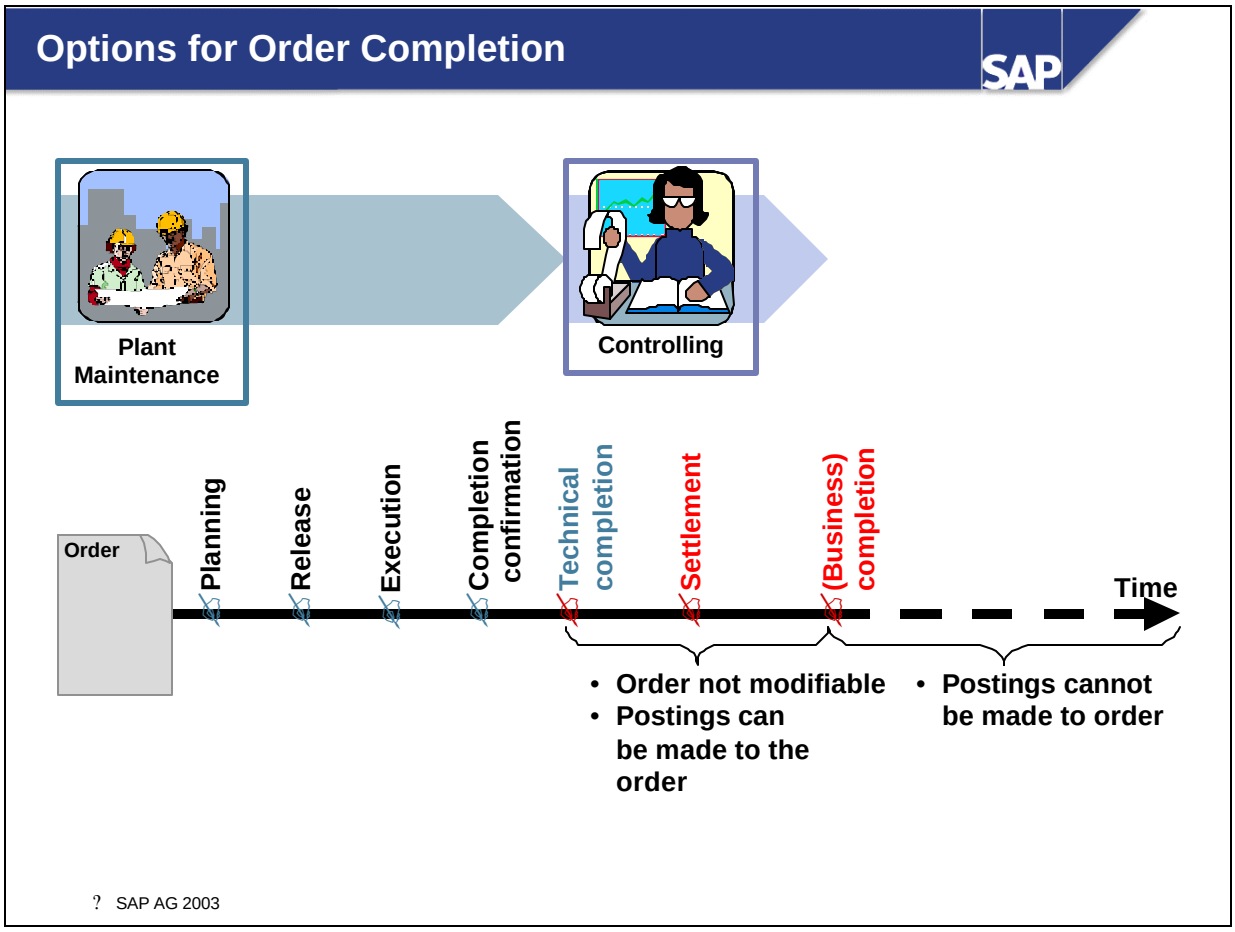
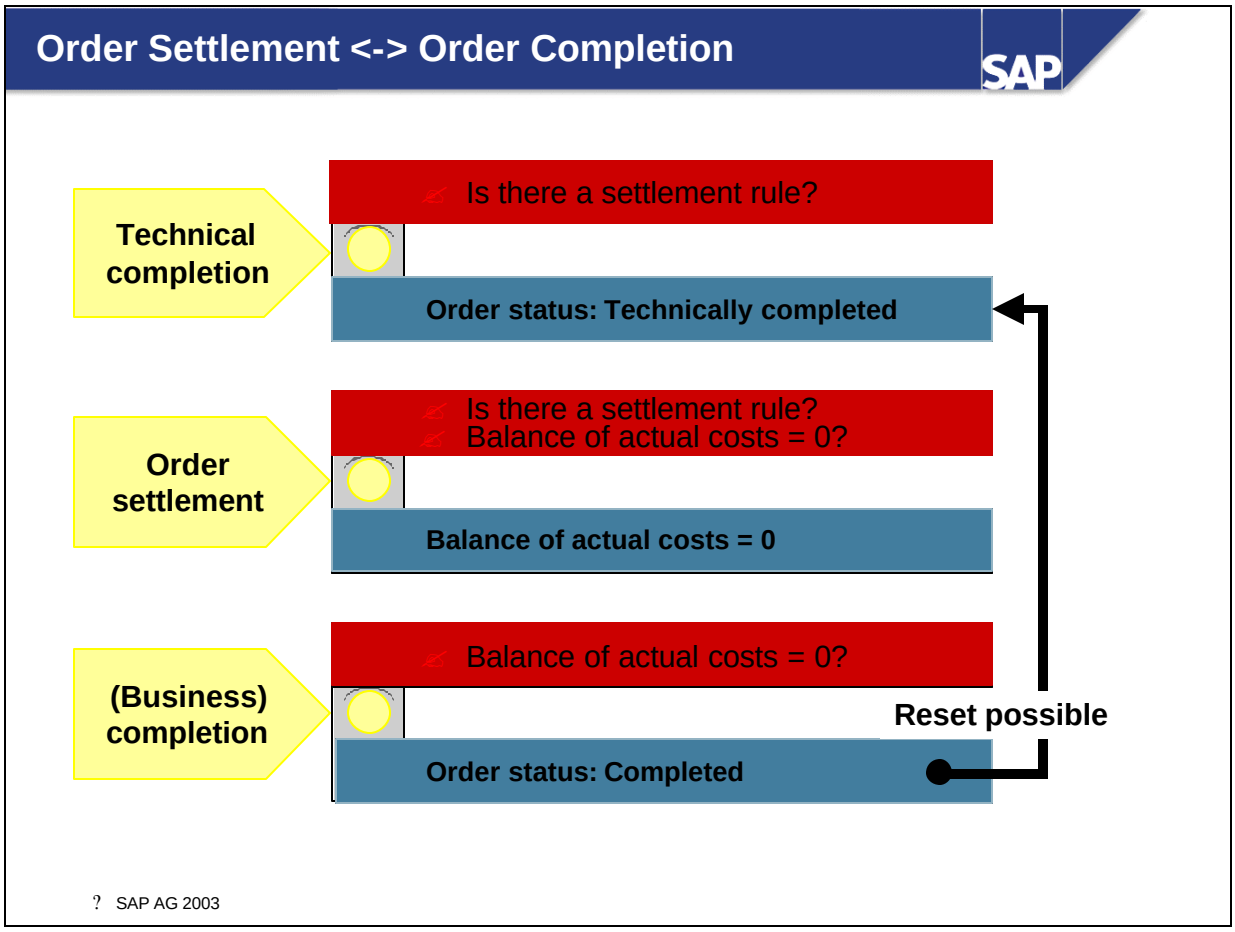


The completion of an order consists of many steps:

- The order is technically completed from a maintenance perspective as soon as all the necessary tasks have actually been executed. No cost flows take place in this case.
  Only the settlement rule is defined here, if it has not already been specified. You can no longer modify the order.
- After technical completion, you can settle the order when you choose. The order is credited with the actual costs.
  It is possible to debit the order with additional costs and then make another settlement.
- A fully settled order (that is, when the actual costs are equal to zero) can be fully completed, in other words, completed from a business perspective. After this point, you can no longer debit the order with actual costs.



- The prior definition of a settlement rule is the prerequisite for technical completion of the order. The order is then flagged as *Technically completed* and can no longer be changed.
- As a prerequisite for settlement, the order must:
  - Contain a settlement rule
  - Have a balance of actual costs not equal to zero

  Once the settlement procedure has been completed, the balance of actual costs equals zero.
- An order can be completed from a business perspective if it:
  - Has been fully settled
  - Has no actual costs

  An order of this type is flagged as "closed" and can no longer be debited with actual costs. You can reset this status if you wish.

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Settlement of Refurbishment Orders

Order settlement overview

Interplay:
Order settlement –
Order completion

Settlement of Object-Based Preventive Maintenance, Inspections and Repairs

Settlement of refurbishment orders

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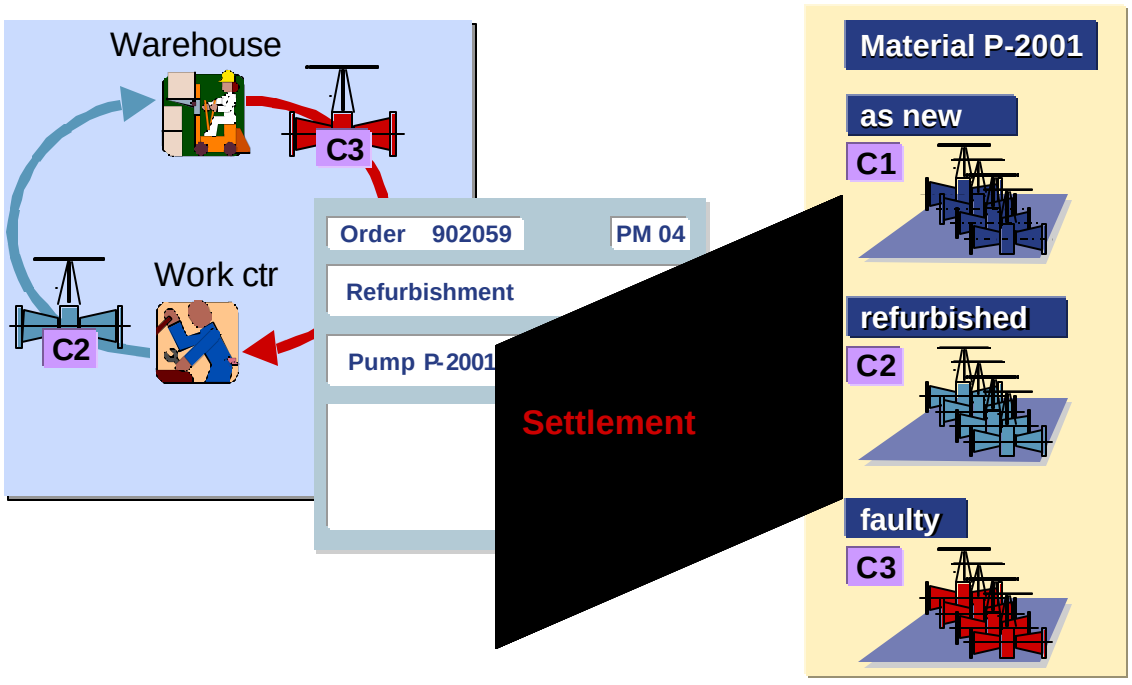
Refurbishment Order Settlement



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- The refurbishment order is settled directly to the material stock.
- The order is **debited** by the value of the corresponding batch on **removal** of the defective part (C3). The order is similarly debited when working time is confirmed.
- In the case of **goods receipt** after refurbishment, the order is **credited** with the value of the batch "refurbished" (C2). This credit is shown as a negative debit.
- In **order settlement**, acquisition posting for the batch of refurbished materials can be carried out in two ways:
  - Price control **Standard price**: acquisition for the batch "refurbished" will be posted at the value of the standard price. The difference between refurbishment costs and the valuation of the batch "refurbished" will be posted as a credit memo to a price difference account (FI).
  - Price control ***Moving average price***: acquisition for the batch "refurbished" will be posted at the value of the actual increase in value, that is, the value of the effort in terms of work and material posted
- This leads to an increase in the moving average price on the material level.
- A **prerequisite** for settling to the material stock is that you define a settlement profile in Customizing where the material is set as a default account assignment. This settlement profile is assigned to the order type for refurbishment.
- The settlement rule "Material" will be determined automatically during refurbishment.

Cost Report for Refurbishment (1)

1. Cost report after stock withdrawal

	Planned	Actual	Planned quantity	Actual quantity
404000 Spare parts	200.00	200.00		
615000 Direct activity allocation for repairs	612.55		5.00 H	
Debit	812.55	200.00	5.00 H	
895000 Factory production orders	-2,500.00			
Credit	-2,500.00			
Total	-1,687.45	200.00	5.00 H	

2. Cost report after time confirmation

	Planned	Actual	Planned quantity	Actual quantity
404000 Spare parts	200.00	200.00		
615000 Direct activity allocation for repairs	612.55	612.55	5.00 H	5.00 H
Debit	812.55	812.55	5.00 H	5.00 H
895000 Factory production orders	-2,500.00			
Credit	-2,500.00			
Total	-1,687.45	812.55	5.00 H	5.00 H

? SAP AG 2001

- 1. Cost report after stock withdrawal
  The order is debited with the value of the defective part (here: valuation price of batch C3 - defective). Under planned costs, the value of a part in the target batch appears under credit (here: valuation price of batch C2 - refurbished) - of the part to be created - as negative costs.
- 2. Cost report after time confirmation
  The order is also debited with the value for the hours worked ('Actual' column).

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Cost Report for Refurbishment (2)

3. Cost report after goods receipt

	Planned	Actual	Planned quantity	Actual quantity
404000 Spare parts	200.00	200.00		
615000 Direct activity allocation for repairs	612.55	612.55	5.00 H	5.00 H
Debit	812.55	812.55	5.00 H	5.00 H
895000 Factory production orders	-2,500.00	-2,500.00		
Credit	-2,500.00	-2,500.00		
Total	-1,687.45	-1,687.45	5.00 H	5.00 H

4. Cost report after settlement

	Planned	Actual	Planned quantity	Actual quantity
404000 Spare parts	200.00	200,00		
615000 Direct activity allocation for repairs	612.55	612,55	5.00 H	5.00 H
Debit	812.55	812.55	5.00 H	5.00 H
895000 Factory production orders	-2,500.00	-812.55		
Credit	-2,500.00	-812.55		
Total	-1,687.45		5.00 H	5.00 H

? SAP AG 2001

- 3. Cost report after goods receipt
  After the goods receipt of the refurbished part, the value for the part in the target batch appears (here: batch C2 - refurbished) as negative costs (= credit memo) under actual costs.
- 4. Cost report after settlement
  A refurbishment order is settled directly to the material stock. When the order is settled, the previous debit on the order is replaced by the **valuation price of the target batch x number of refurbished parts** - and the resultant increase in value of the material stock is replaced by the debit from the actual resources required (**actual working time + materials used**). This total is settled directly to the material and leads to an increase in the total stock value and thereby the moving average price.

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Effect of Refurbishment on Stock Value of Material

Stock value before processing

Condition	Price	Quantity	Stock value
C1	€ 1,500.00	10	€ 15,000.00
C2	€ 1,200.00	20	€ 24,000.00
C3	€ 100.00	10	€ 1,000.00
Stock value			€ 40,000.00
Moving average price			**€ 1,000.00**

Stock value during processing

Quantity	Stock value
10	€ 15,000.00
21	€ 25,200.00
9	€ 900.00
	€ 41,100.00
	€ 1,027.50

Stock value after settlement

Quantity	Stock value
10	€ 15,000.00
21	€ 24,350.00
9	€ 900.00
	€ 40,250.00
	€ 1,006.25

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- If the movement types (partial stocks) have a valuation with a floating average price, then the overall stock value of the material rises by the effective expenditure of the order (working time + material/ here: 5 hours at a total of € 250 + € 100 for the residual value of the defect part) after settlement.
- This in turn leads to a rise in the floating average price at the overall material level, depending on the expenditure of the order (not on the valuation price of the partial stock).

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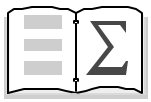
Settlement of Orders: Summary



You are now able to:

- **Settle a standard order**
- **Make the relevant settings in Customizing**
- **Settle a refurbishment order**

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Exercises

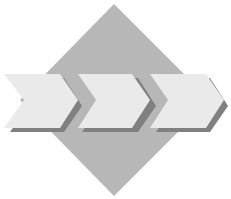
Unit: Settlement of Orders

Topic: Settlement of Object-Based Preventive Maintenance, Inspections and Repairs

At the conclusion of these exercises, you will be able to:

? Settle orders

? Define settlement cost elements



The costs collected on the maintenance order during the execution of a maintenance task should either be forwarded to the recipient periodically or when the task is completed.

2-1 Verifying the Settlement Rule

Display the settlement rule for your order.

How do you proceed?

_____

_____

_____

What settlement rule(s) do you find?

Cat.	Receiver	Percent	Settlement type	No.

2-2 Verifying the Settlement Profile

Use the Customizing function to determine the settlement profile for your order.

How do you proceed?

_____

_____

_____

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The settlement profile for your order is:

_____

2-3 Determine which allocation structure has been assigned to the settlement profile. Determine from which debit cost element the credit cost element for your order is defined.

How do you proceed?

_____

_____

_____

The allocation structure is:

_____

Which credit cost elements are valid for which debit cost elements in your order?

Debit cost element (cost element under which the order posts debits as actual costs)	Credit cost element (cost element from which the order is settled)

2-4 Settling an order

Settle your order.

How do you proceed?

_____

_____

_____

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2-5 Analyzing order costs

Display the actual costs per cost element for your order.

How do you proceed?

_____

_____

_____

What settlements (credits) are posted by the order?

Cost element	Actual (credits)

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Unit: Settlement of Orders

Topic: Settlement of Object-Based Preventive Maintenance, Inspections and Repairs

2-1 ***SAP menu*** *?* ***Logistics*** *?* ***Plant Maintenance*** *?* ***Maintenance Processing*** *?* ***Order*** *?* ***Change***

Settlement rule symbol or ***Goto*** *?* ***Settlement rule***

Payroll rules:

Cat.	Receiver	Percent	Settlement type	No.
CST	4110	100	FUL	1
CST	4110	100	PER	2

2-2 ***SAP menu*** *?* ***Tools*** *?* ***Customizing*** *?* ***IMG*** *?* ***Edit Project***

SAP Reference IMG button

Plant Maintenance and Customer Service *?* ***Maintenance and Service Processing*** *?* ***Maintenance and Service Orders*** *?* ***Functions and Settings for Order Types*** *?* ***Configure Order Types***

Select line with order type PM01

Goto *?* ***Detail***

Settlement profile: 40

2-3 SAP menu *?* Tools *?* Customizing *?* IMG *?* Edit Project

SAP Reference IMG button

Plant Maintenance and Customer Service *?* ***Maintenance and Service Processing*** *?* ***Basic Settings*** *?* ***General Order Settlement*** *?* ***Maintain Settlement Profiles***

Select line with settlement profile 40

Goto *?* ***Detail***

Allocation structure PM

Plant Maintenance and Customer Service *?* ***Maintenance and Service Processing*** *?* ***Basic Settings*** *?* ***General Order Settlement*** *?* ***Maintain Allocation Structures***

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Select line with allocation structure PM

Select assignments

Use the assignments to verify the position of the debit cost element:

Double-click assignment line

>Double-click Source

> Double-click on cost element group

Cost element 400000 is contained in assignment 001 ‘Raw Material cost’

Cost element 615000 is contained in assignment 020 ‘Activity allocation’

Determine the settlement cost element for each origin

Select assignment line

>Choose settlement cost elements

Cost element 400000 is settled on cost element 652000

Cost element 615000 is settled on cost element 652000

2-4 ***SAP menu*** *?* ***Logistics*** *?* ***Plant Maintenance*** *?* ***Maintenance Processing*** *?* ***Completion*** *?* ***Individual Processing*** *?* ***Settle***

Field Name or Data Type	**Values**
Controlling area	1000
order	Enter order number
Settlement period	Enter current month
Fiscal year	Enter current year
Processing type	1 (automatic)
Test run	(not active)

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2-5 ***SAP menu*** *?* ***Logistics*** *?* ***Plant Maintenance*** *?* ***Maintenance Processing*** *?* ***Order*** *?* ***Change***

Costs tab page, *Actual/plan report* button

Settlement

Settlement cost element	**Description**
652000	Order settlement for material
652000	Order settlement Internal activity

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Budgeting and Cost Planning

- Overview of budgeting options
- Individual budgets
- Maintenance projects
- Investments
- Maintenance cost budgeting

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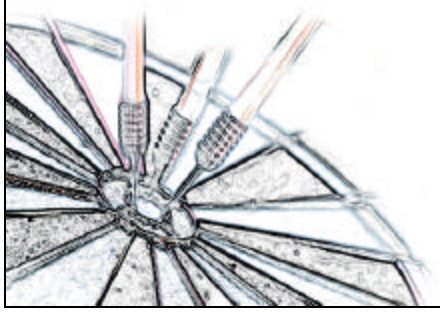
Unit Objectives

At the conclusion of this unit, you will be able to:

- **Describe the different options for budgeting a maintenance order**
- **Couple maintenance orders to projects**
- **Link maintenance orders to investment programs**
- **Create investment orders**



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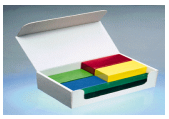
Course Overview Diagram

Course Overview

Settlement of Orders



Introduction

Budgeting and Cost Planning

Costs in maintenance process

Business Intelligence

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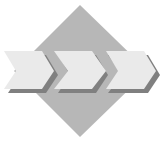
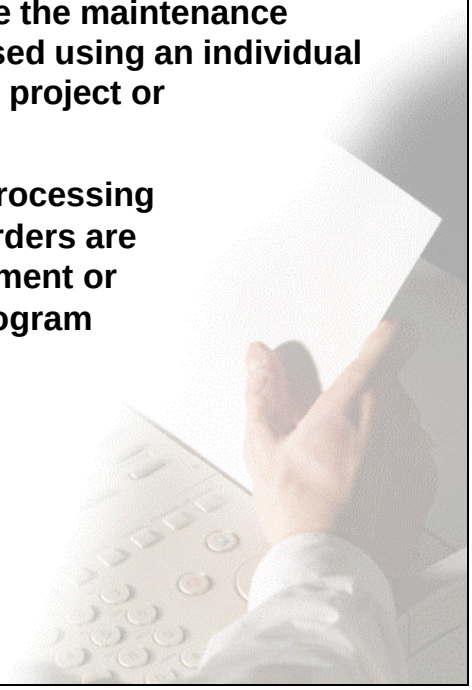
Business Scenario



- Larger projects, such as new developments or modifications, which involve the maintenance department, are not processed using an individual maintenance order, but as a project or investment measure.
- Depending on the chosen processing method, the maintenance orders are then assigned to a WBS element or an item in an investment program and controlled accordingly.



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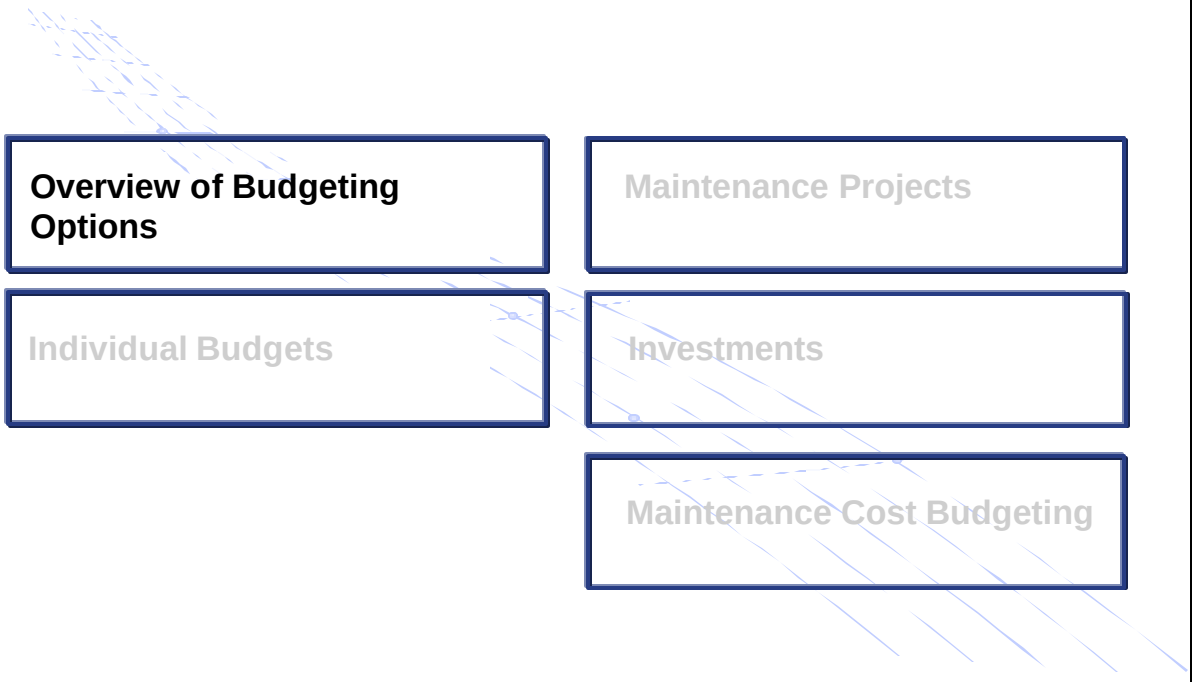
Overview of Budgeting Options



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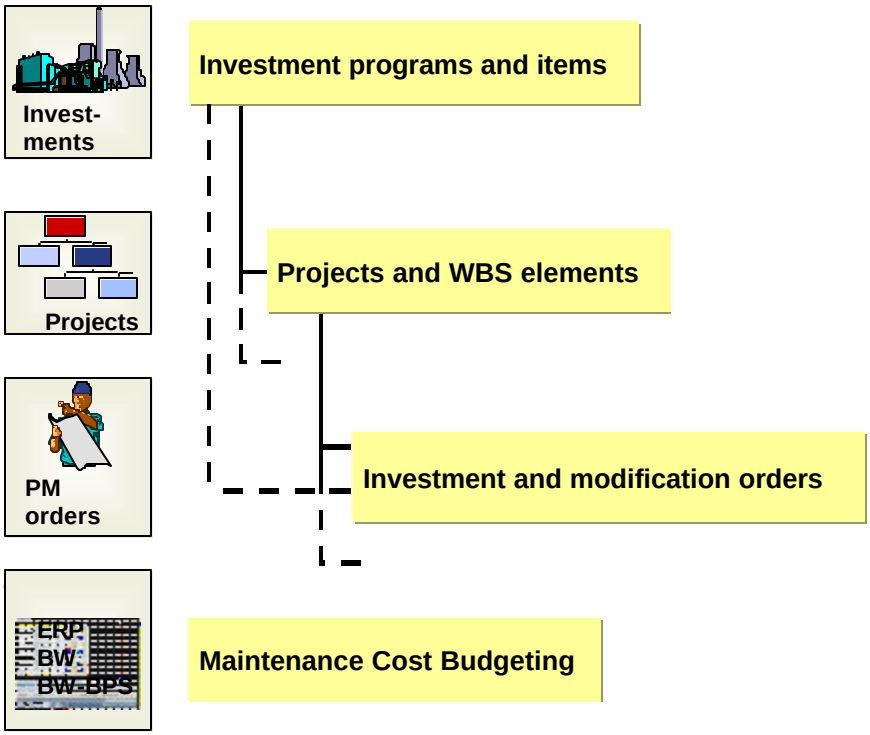
Budgeting Elements: Overview



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- Investment management (IM) and its functions supports the planning, investment and financing process in your own company and is available already in SAP R/3. An **investment program** is a hierarchical structuring of intended business activity within IM to realize investments for an approved year.
- An **investment program item** is a "node" of an investment program. It refers to a responsible organizational unit, for which the user can define additional characteristics (for example, investment type). An investment program item contains budgeted and planned values.
- A **project** builds the framework for an intended business activity with a fixed objective that should be achieved using the resources specified. Projects are also available already in SAP R/3.
  The project contains dates and obligatory organizational data.
- A **WBS element** is an individual element of the Work Breakdown Structure (WBS) that shows the hierarchical organizational structure of a project. A WBS element describes either a concrete task or a task that can be further sub-divided.
- **Modification and investment orders** are a special type of maintenance order in maintenance (PM) and are available in SAP R/3. The represent large maintenance processes. Specific cost monitoring uses these orders, because most lead to changes in fixed assets.
- **Maintenance Cost Budgeting** became available in mySAP ERP 2004. In SAP BW-BPS (SAP Business Information Warehouse) you can use functions for budget planning in maintenance and customer service. BW-BPS (BW-Business Planning and Simulation) enables you to create planning applications.
  You can develop your own planning application or use the Business Content provided by SAP. Budget planning can be based on planning-data-based budgeting (such as maintenance task lists) or history-based budgeting (such as actual costs from maintnance orders).

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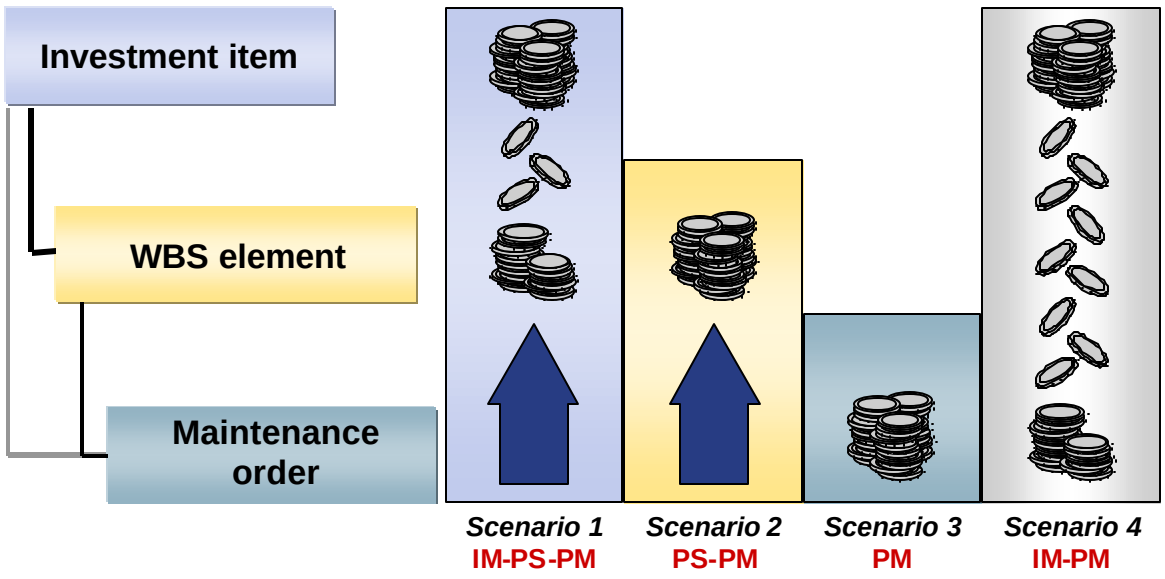
Budget Definition and Distribution: IM-PS-PM



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- **Scenario 1:** In this scenario, you define investment programs and roughly structure them using investment positions. The intended business activity is described in greater detail in the form of projects and WBS elements. You assign individual maintenance orders to the respective WBS element.
  You define the budget at the level of the respective investment item and distribute it amongst the subordinate WBS elements. The orders all use the budget of the WBS element to which they are assigned.
- **Scenario 2:** Investment programs/items are not applicable here. You define intended business activity in the form of projects and structure them in individual WBS elements. You assign the WBS elements to specific maintenance orders that use the budget defined at WBS element level.
- Scenario 3: The maintenance order itself bears the budget defined for specific individual tasks.
- **Scenario 4:** Here you can typically define all-year-round maintenance programs as investment programs and structure them using investment items. You assign maintenance orders to investment items.
  You can define the budget at the level of the respective investment item and distribute it among the assigned orders.

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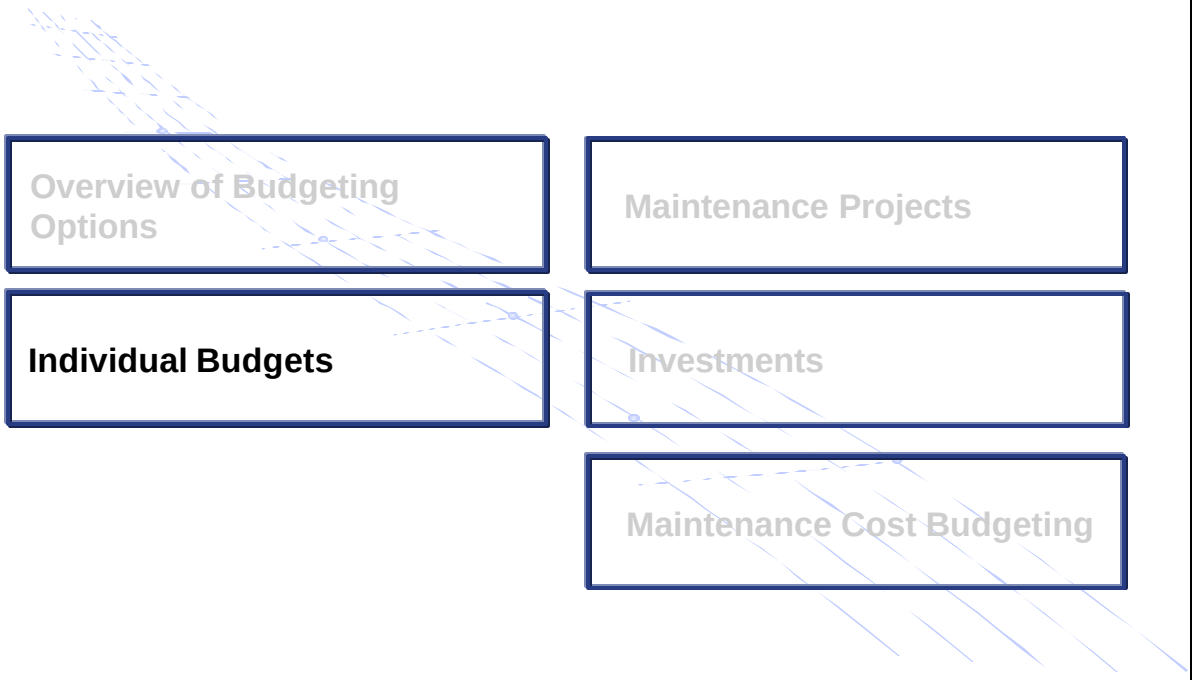
Individual Budgets



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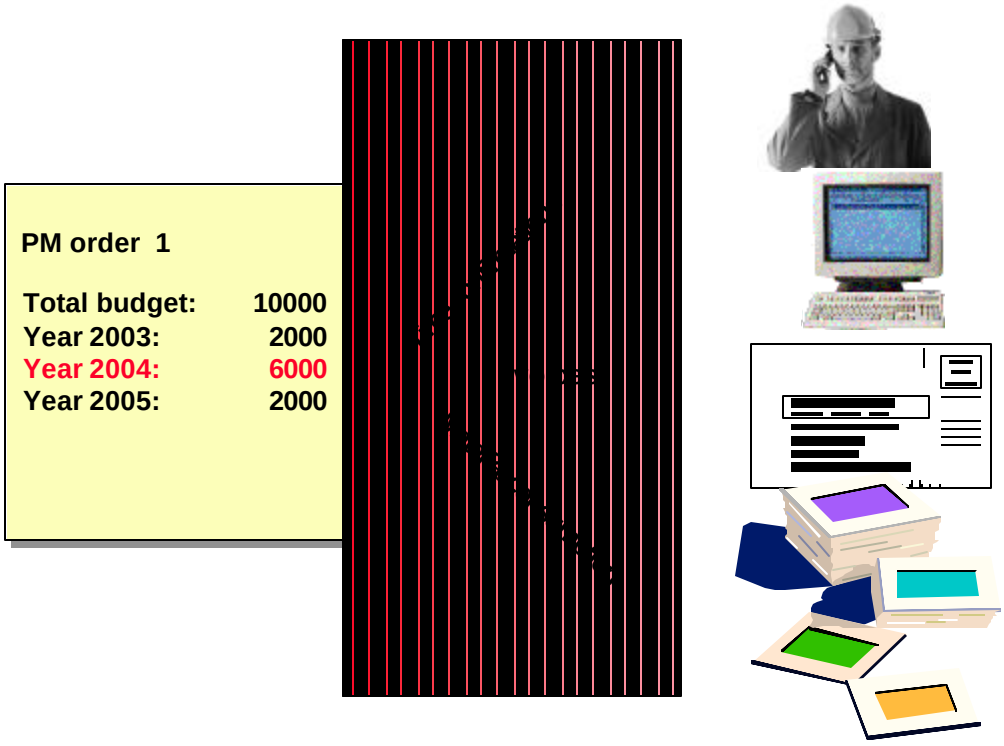
PM Order: Budget



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- From the CO view, a budget can be assigned to the order. The prerequisite for this is that the order type has a budget profile.
- This budget is allocated on the one hand as a total budget and on the other as a yearly budget. The total of the yearly budget must not exceed the total budget.
- In order hierarchies, the budget applies to the individual PM order only.
- Active budget control takes place with actual postings. You can define the type of messaging (errors, warning message, information) in CO customizing.
- Planned costs are only checked against the budget if they lead to a commitment, that is, only external services/material are checked. The prerequisite for this check is that function for commitments management is activated.

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Controlling of Budgeted Orders

Budget Report: Orders: Results

Year: Whole Currency: EUR

Order list	budget	Actual	Commitments	Available
902559	5000,00	1200,00	3000,00	800,00
*	5000,00	1200,00	3000,00	800,00

Current budget
- Actual
- Commitments (if *Commitments Management* active)
= Available budget

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- An order is budgeted by entering a budget against the individual order. This also sets the system status "Budgeted".
- Budget control takes place using a report that is integrated with the processing of the order and shows the relevant values according to the above rule.
- You can check what funds are available for actual costs. In this case, planned values are only considered if they lead to a commitment update.

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Budget Profile in Detail

Budget profile — How is the budget managed?

- determines
  - Which budget values can be maintained?
  - On which value is the availability check based?

Rules

- Which operations are subject to the check?
- What are the check prerequisites?
- Which subsequent processing is triggered?

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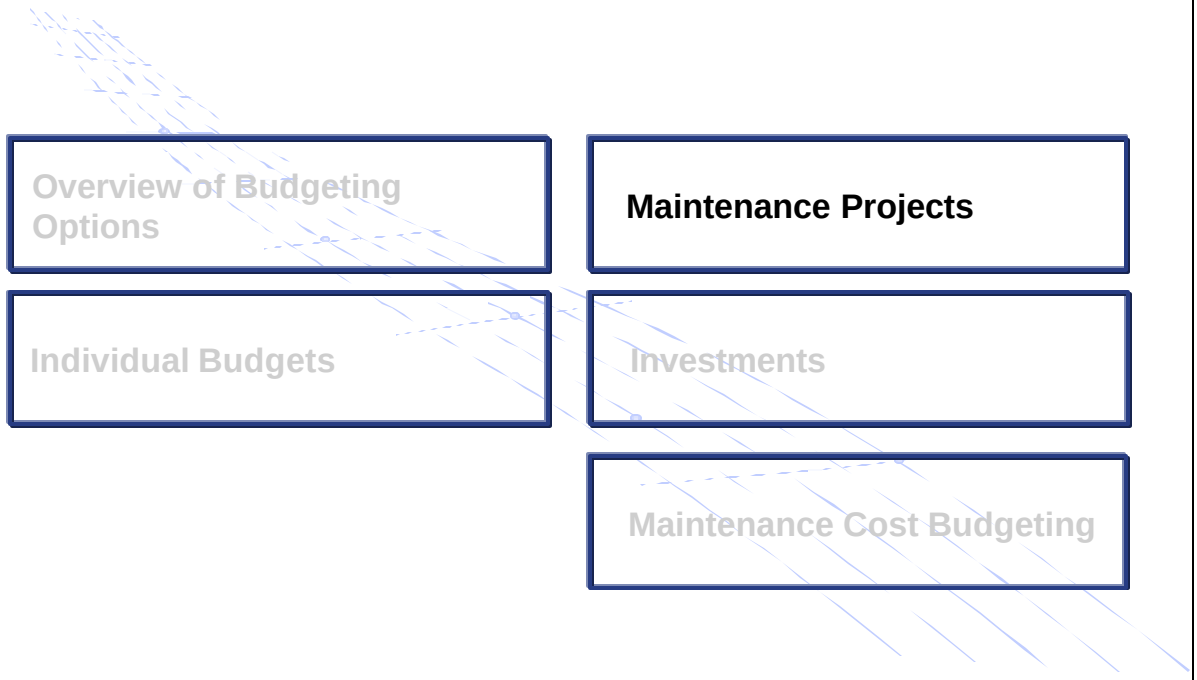
Maintenance Projects



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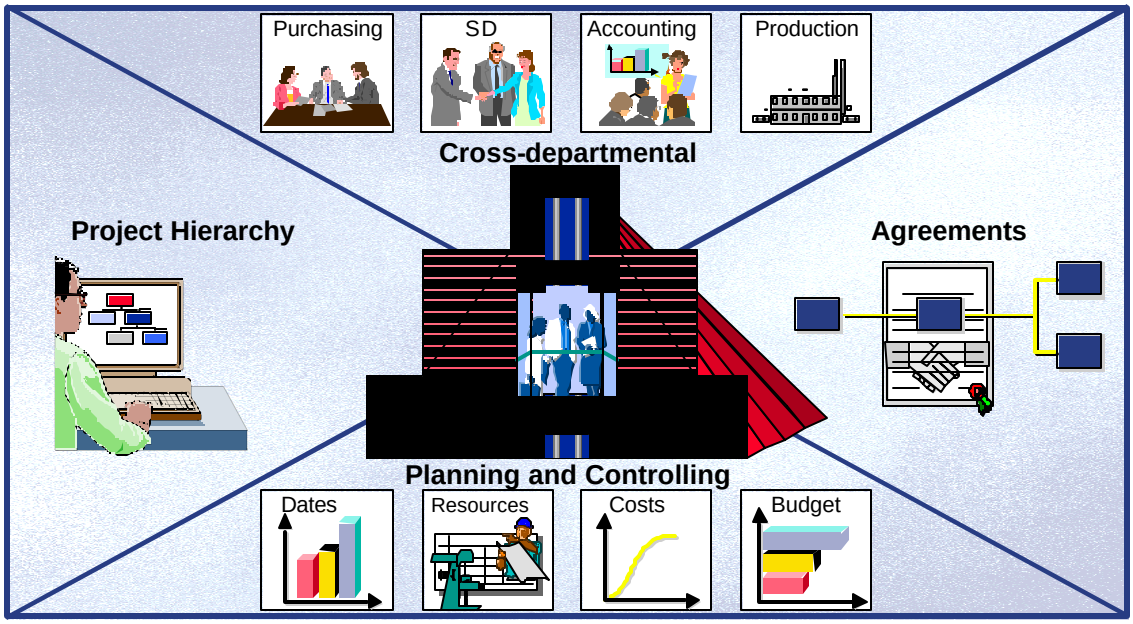
Role of Projects



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- Projects are tasks with special features:
  - They are usually complex, unique and involve a high level of risk.
  - They have precise budgets that are agreed between two or more parties.
  - They are of limited duration and are also cost and capacity intensive.
  - They are subject to certain quality requirements.
  - They are usually strategically important for the project owner.
- Projects are generally integrated into the operational procedures of a company. You will need an organizational form for the project that relates the project to the relevant departments involved to manage all the necessary tasks in the execution of the project.

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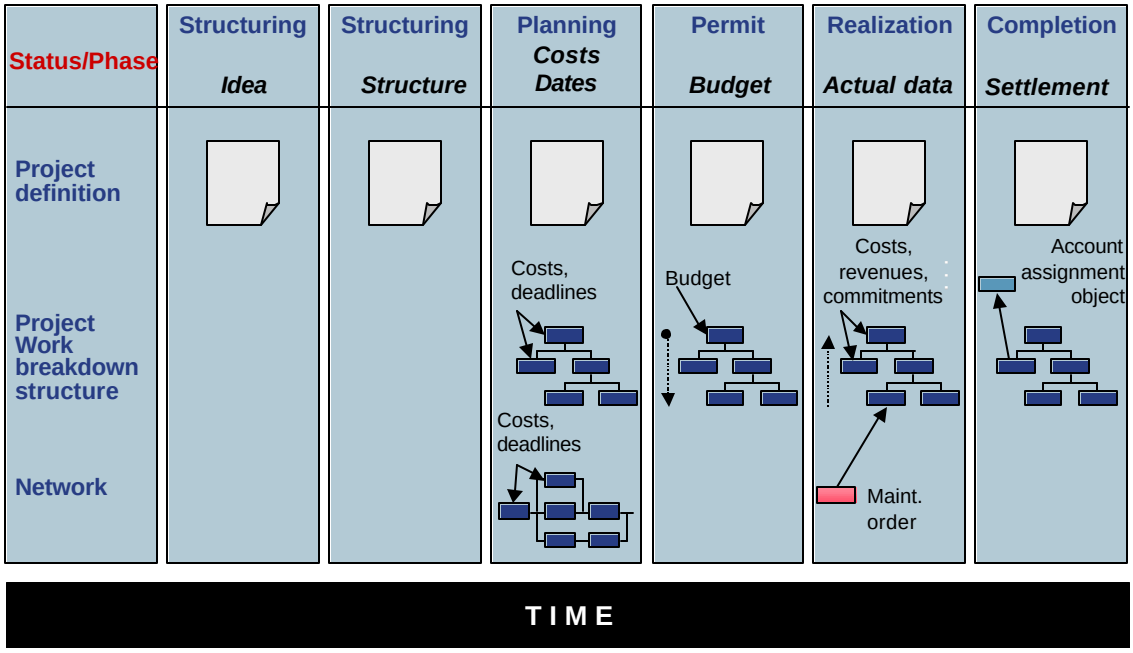
Functional Structure



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- A project is a **unique event of limited duration** that involves many different departments in its realization.
  A project describes a complex, structured task within a controlling area.
  It is used to monitor and control this task with regard to **dates**, **resources**, **capacities**, **costs**, **revenues** and **funds**.
  A project is split into different phases.
- A work breakdown structure (WBS) is a project model that represents the tasks to be performed hierarchically. It is a **formal tool** to make a project more transparent and manageable.
  The work breakdown structure (WBS) represents the hierarchical organizational structure of a project.
- WBS elements are the individual **operational structure elements** of the work breakdown structure (WBS).
  They describe either a concrete task or a task that can be further sub-divided.

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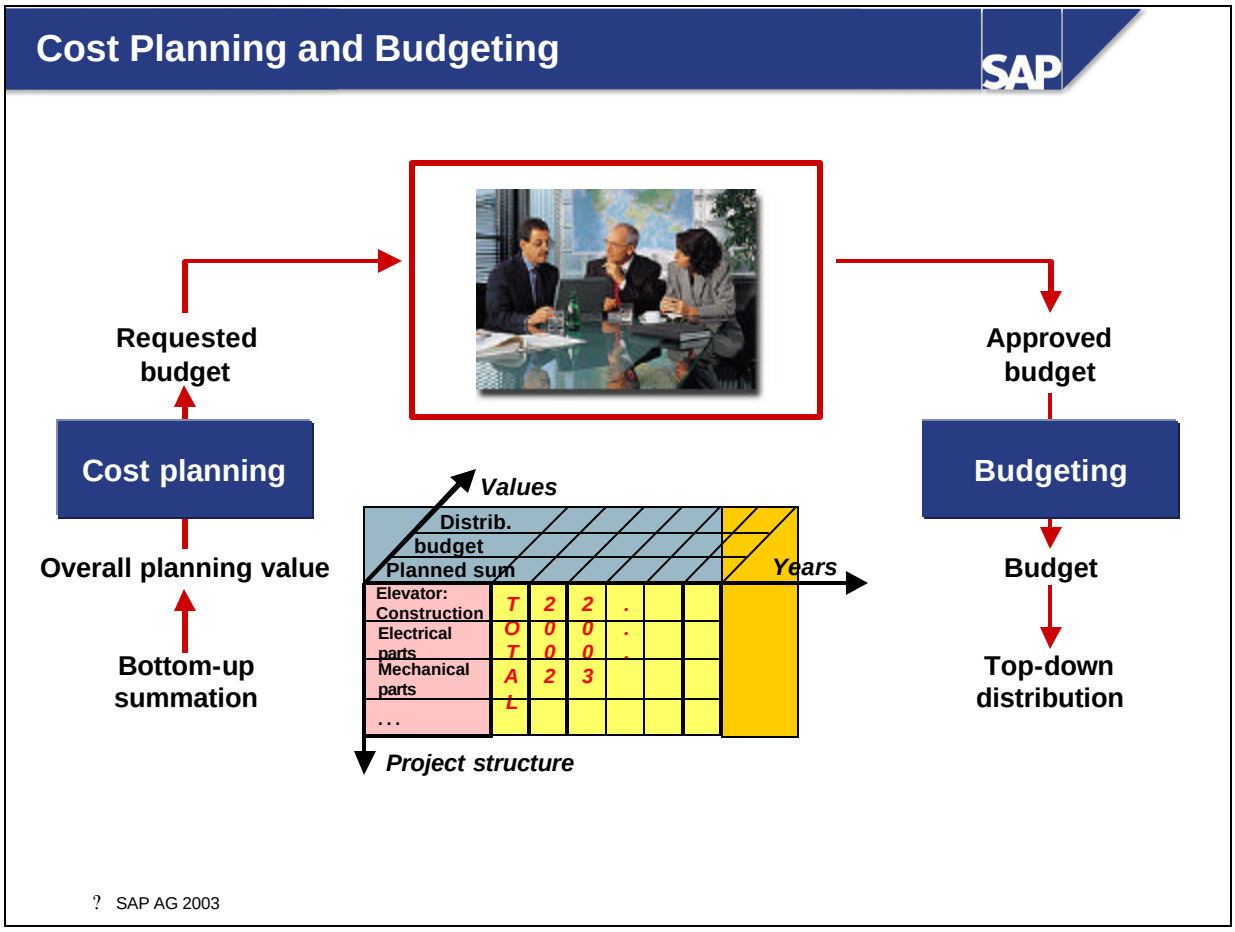

- Costs must be estimated as accurately as possible in the **cost planning** phase. Funds are made available in the form of a budget in the approval phase.
- The budget differs from cost planning for the project by its compulsory nature. The **budget** is the **framework** decided upon by the management to manage project costs within a certain time period.

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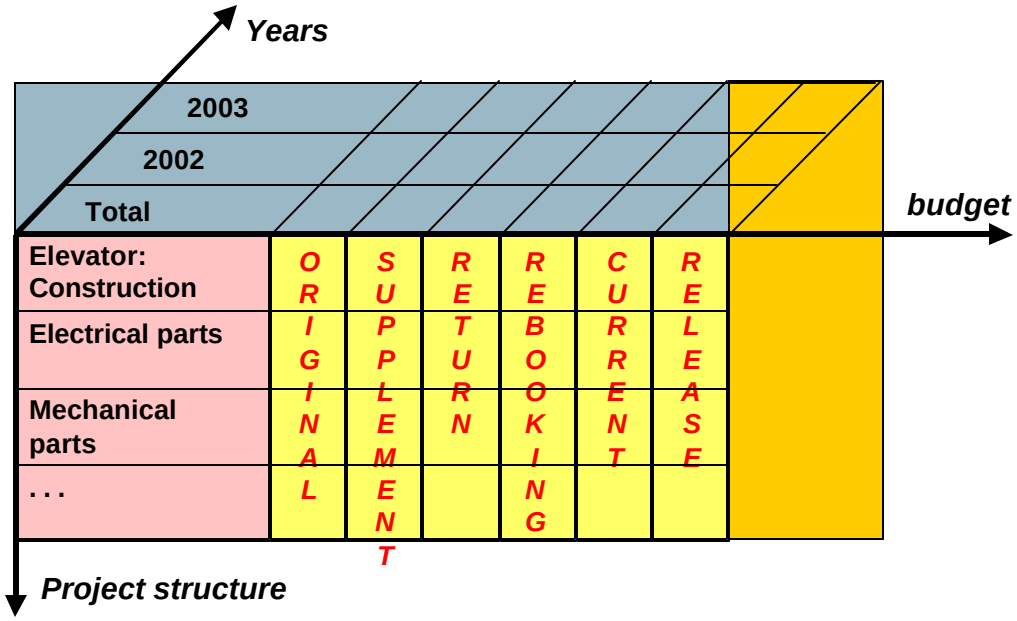
Budgeting Options: Overview



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- The first phase of budgeting is to establish the original budget for the WBS elements that should be used as controlling elements. The budget can first be laid down as an overall budget and then distributed over individual years.
- The current budget is the original budget modified by supplements, returns or transfers.
- The budget is released successively on the basis of the current budget.

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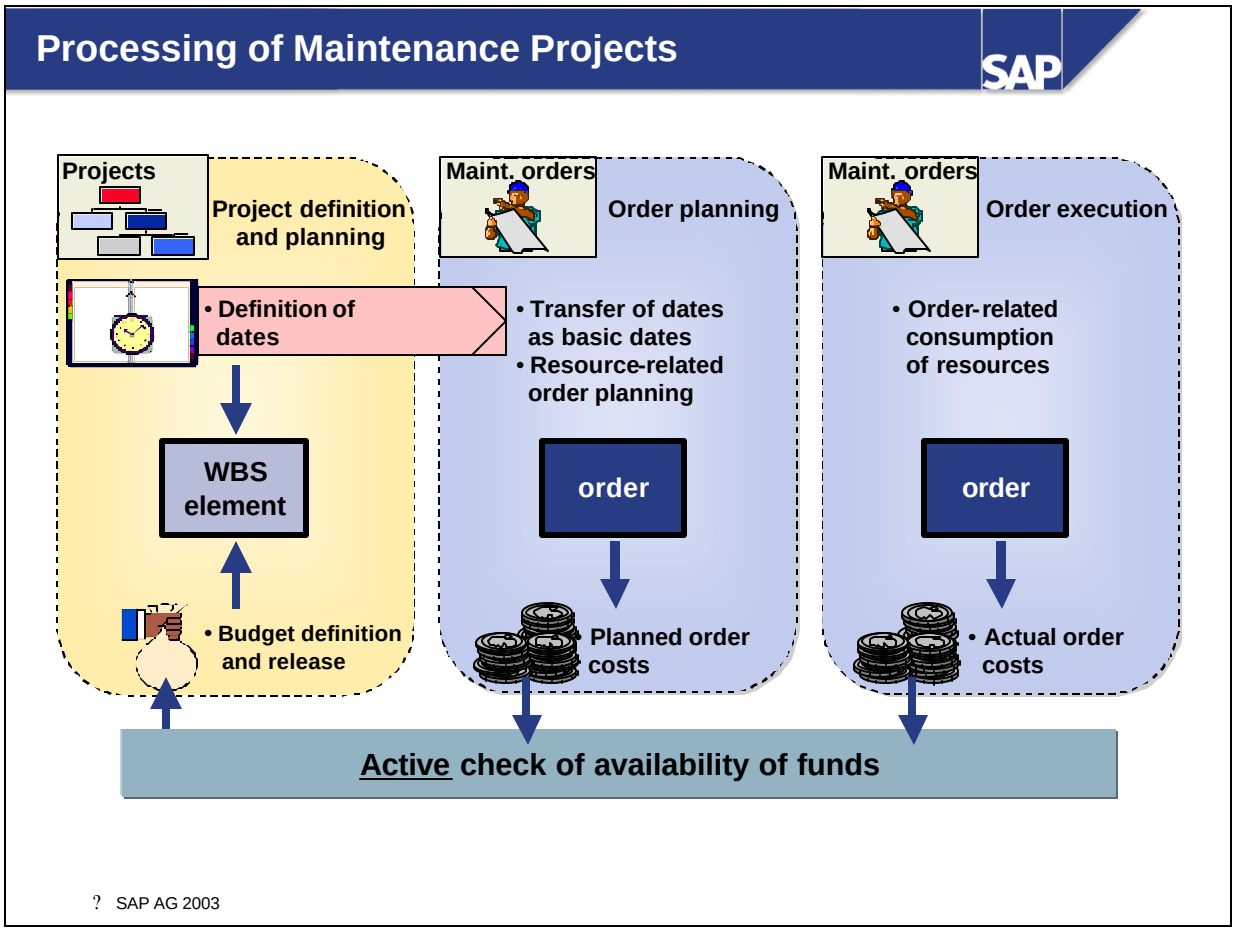
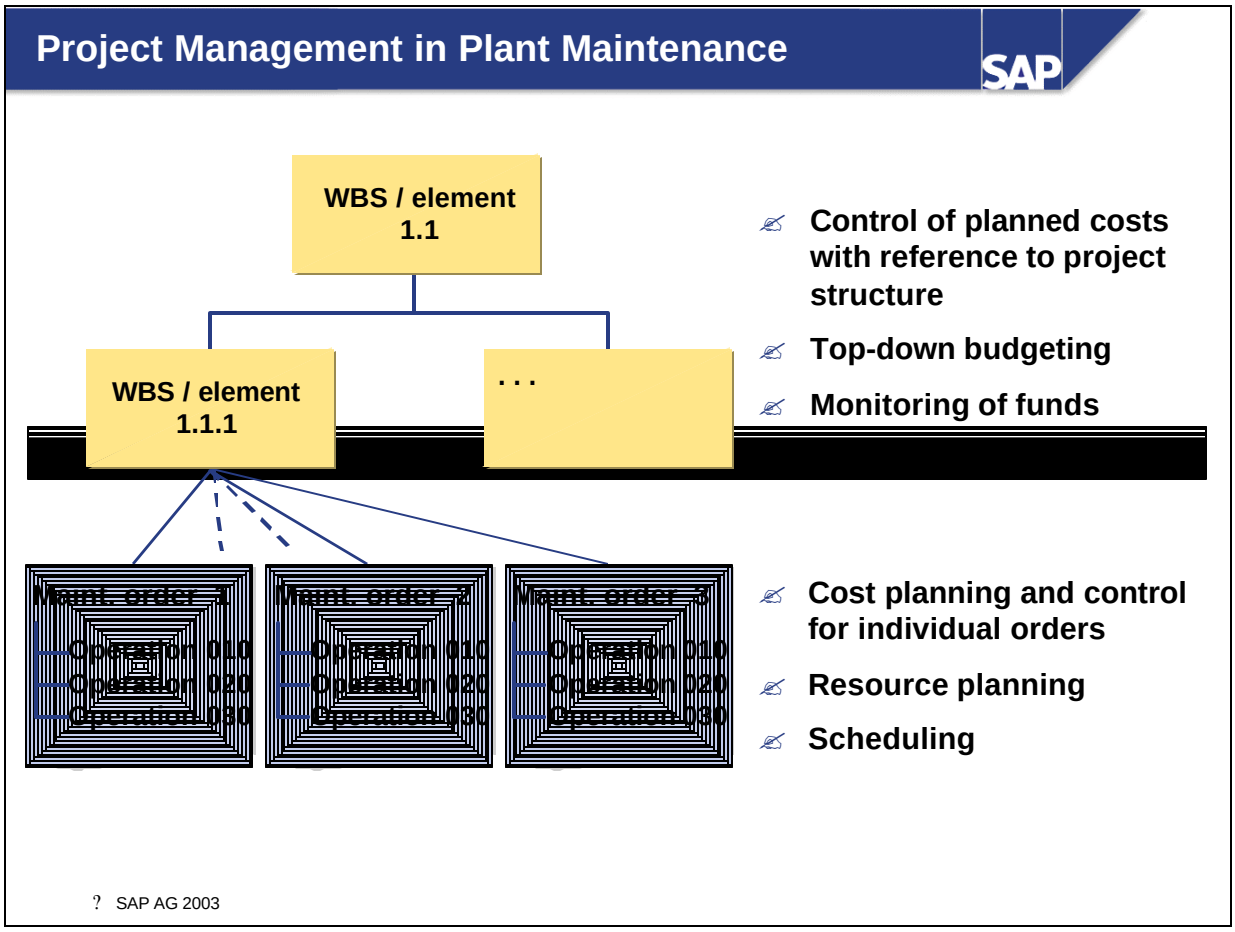


- Project definition and planning takes place in the Project Information System. The project structure (including the operational WBS elements, dates, costs, and budgets) is agreed here.
- In planning project-related maintenance work, you can use the link to the project system for two purposes:
  - To coordinate the scheduling of complex projects
  - To monitor and control financial resources for complex projects

  If you assign a maintenance order to a WBS element, you can:
  - Copy the dates of the WBS element as basic dates for the order
  - Copy the budget of the WBS element as available funds to be compared to the planned order costs
- If you are carrying out project-based maintenance orders, the link between the order and the WBS element enables you to perform an active availability check on the financial resources that have been allocated. Planned and actual values are checked against the budget at WBS element level.
- You cannot divide the budget among individual orders at this level.



- Scheduling, budget planning and monitoring of schedules and budgets is performed at the level of the respective WBS element.
- Scheduling and planning of resources for individual tasks is performed at the level of the respective order, with reference to the deadlines in the WBS element and in adherence to the budget.

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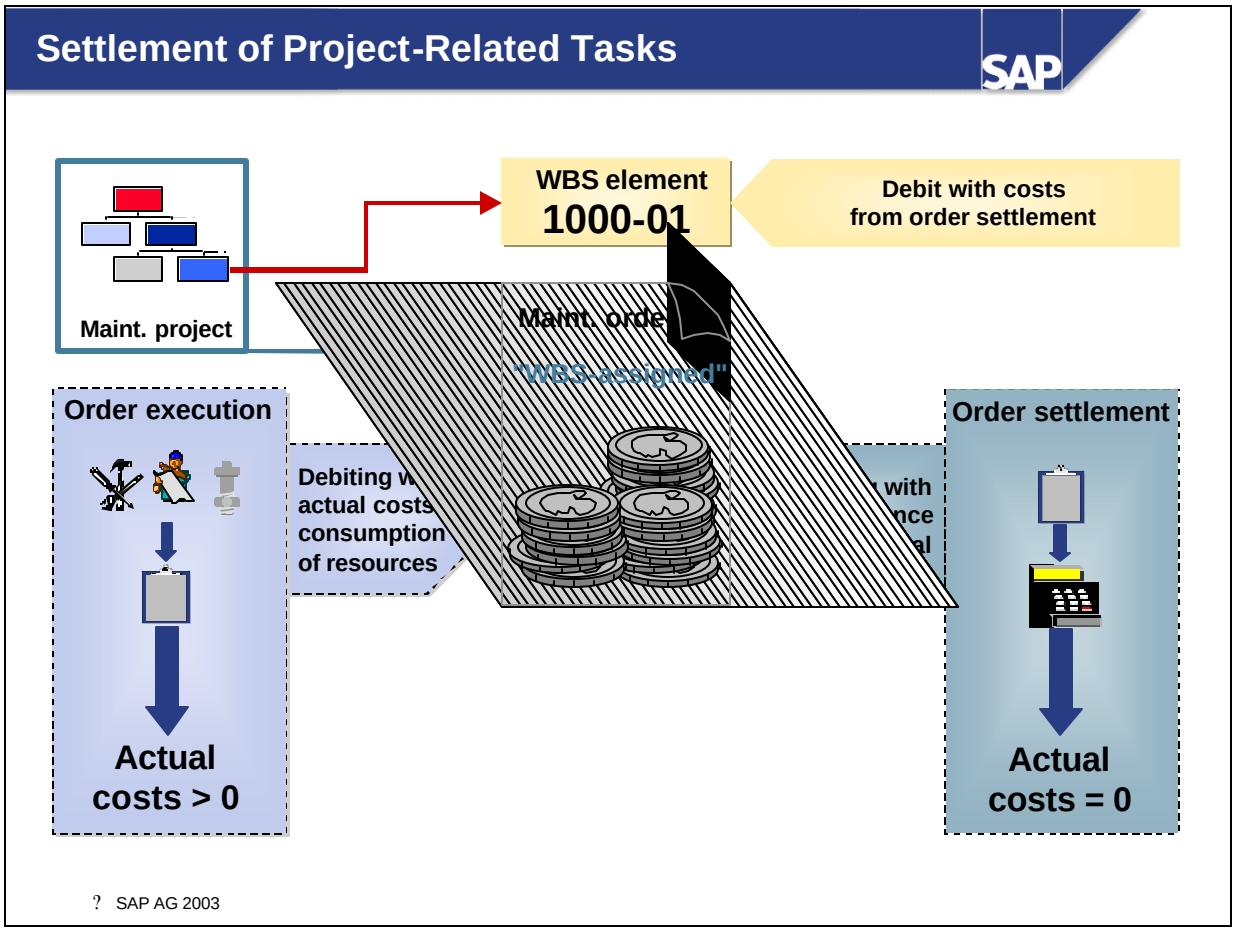

- Project-related maintenance tasks that are performed within the framework of a larger overall project are generally settled to WBS elements. The corresponding WBS element must be entered as the receiver in the settlement rule for this purpose.
- The actual order costs are thereby transferred to the WBS element, which means that the WBS element is credited while the order itself is debited with these costs.
- The balance of actual order costs equals 0 after full settlement while the actual costs of the WBS element are greater than 0.

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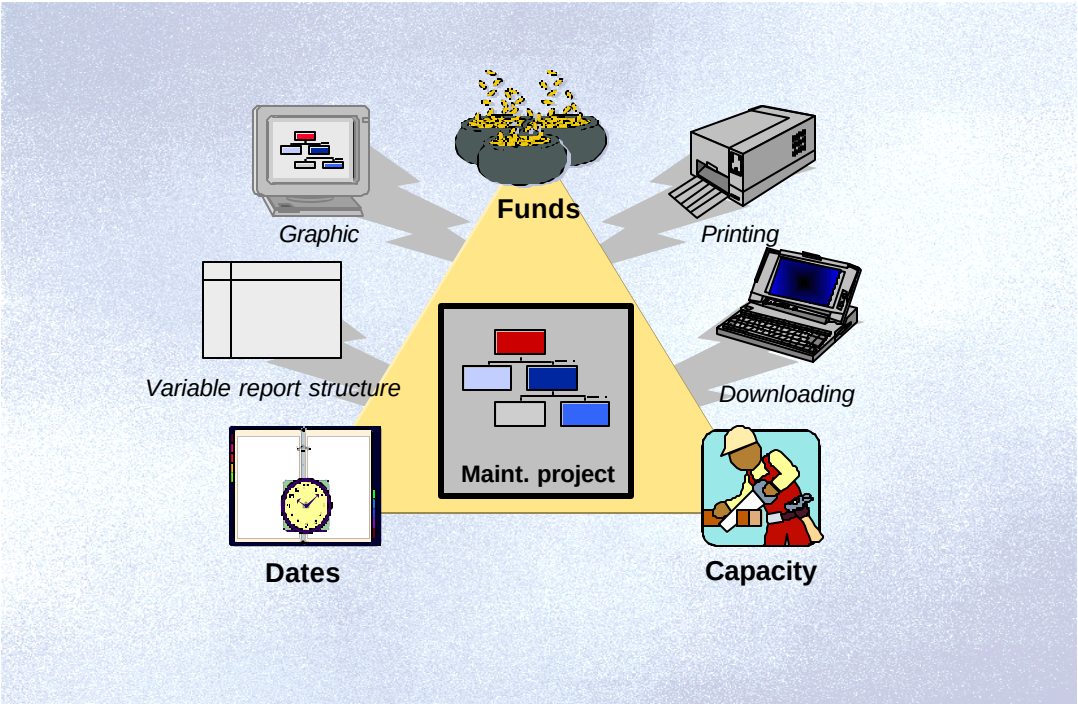
Project Information System



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- The Project Information System is available to you as an analysis tool for complex maintenance projects.
- The information system enables you to view and analyze project data from the perspective of capacity, dates or financial resources.
- The information system for costs enables you to display actual data for budgets, costs and revenues as summaries and with differing levels of detail.
- The report tree is used to gather all reports centrally within a component and arrange them in hierarchical order. The reports are the end nodes on the report tree. There are three types of reports: structure reports, cost element reports and line item reports.
  The structure report makes a comparison of planned/actual/budget/available values for projects, project hierarchies or WBS elements. The cost element report allows you to evaluate projects, WBS elements and networks by cost element. The line item report enables you to evaluate single postings flexibly according to different criteria.
- In addition, the information system allows you to exchange project information with internal and external participants.
  The integration of MS Excel, MS Word and MS Project means that you can use data from your project for additional planning and calculation purposes or for planning your project decentrally.

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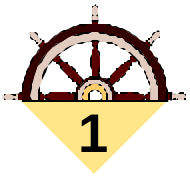
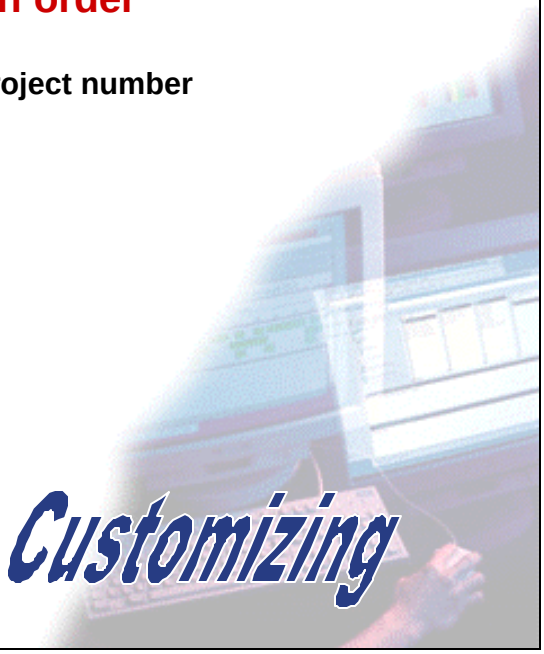
Relevant Settings



Rules for copying a WBS element to an order

- Define transfer of project number



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Investments

Overview of Budgeting Options

Maintenance Projects

Individual Budgets

Investments

Maintenance Cost Budgeting

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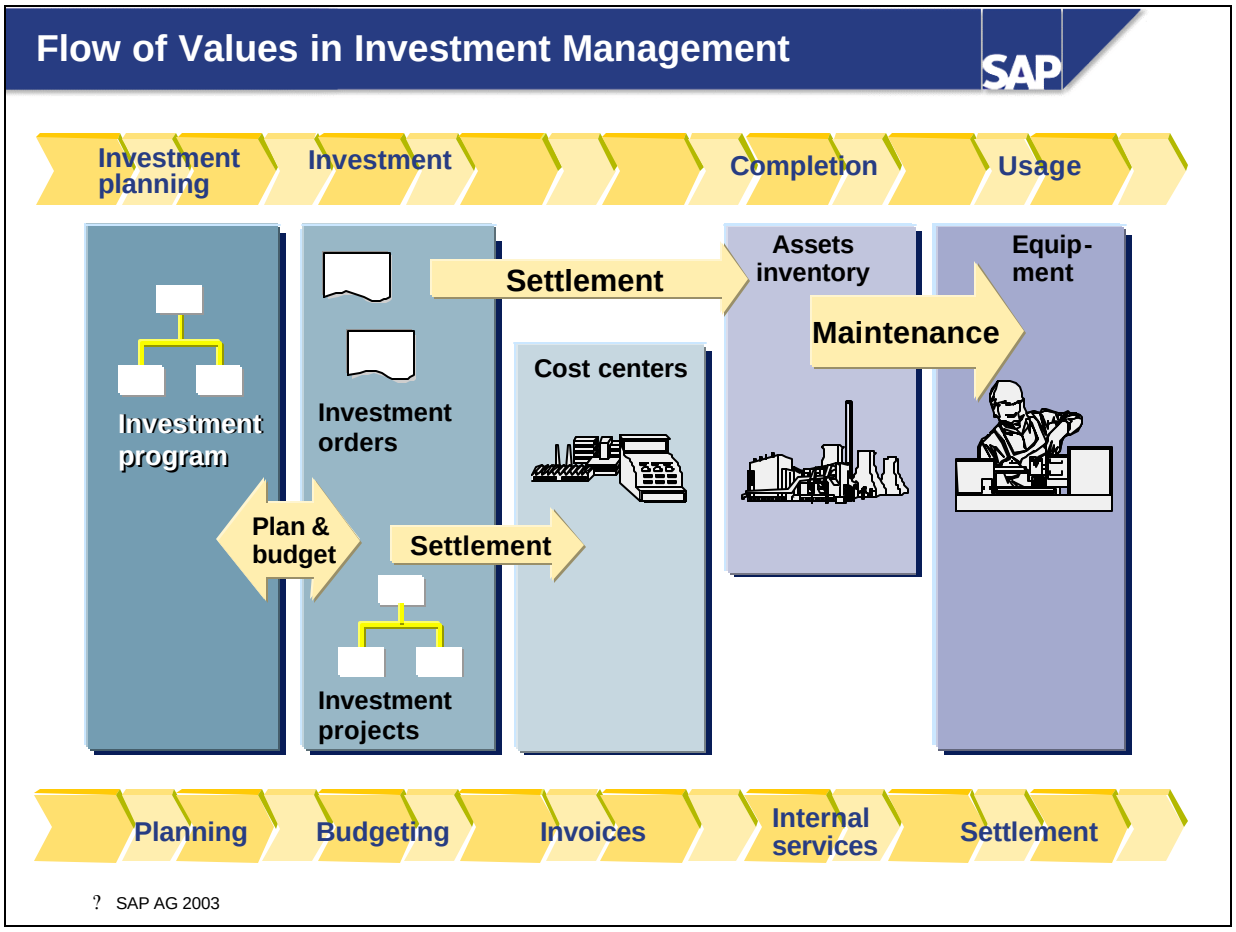

- Investment orders and tasks (orders or projects) can be connected with one another using the option of integrated planning and budgeting.
- The assigned funds from purchase orders, invoices, internal services and so on are assembled on the capital investment measures. You can report on these values from an investment program perspective.
- Actual assignments are periodically settled to the receiver in cost accounting or, if capitalization is necessary, to the fixed assets under construction. Settlement is made to final assets after construction.
- During the usage phase, you can monitor maintenance costs using pieces of equipment or functional locations.

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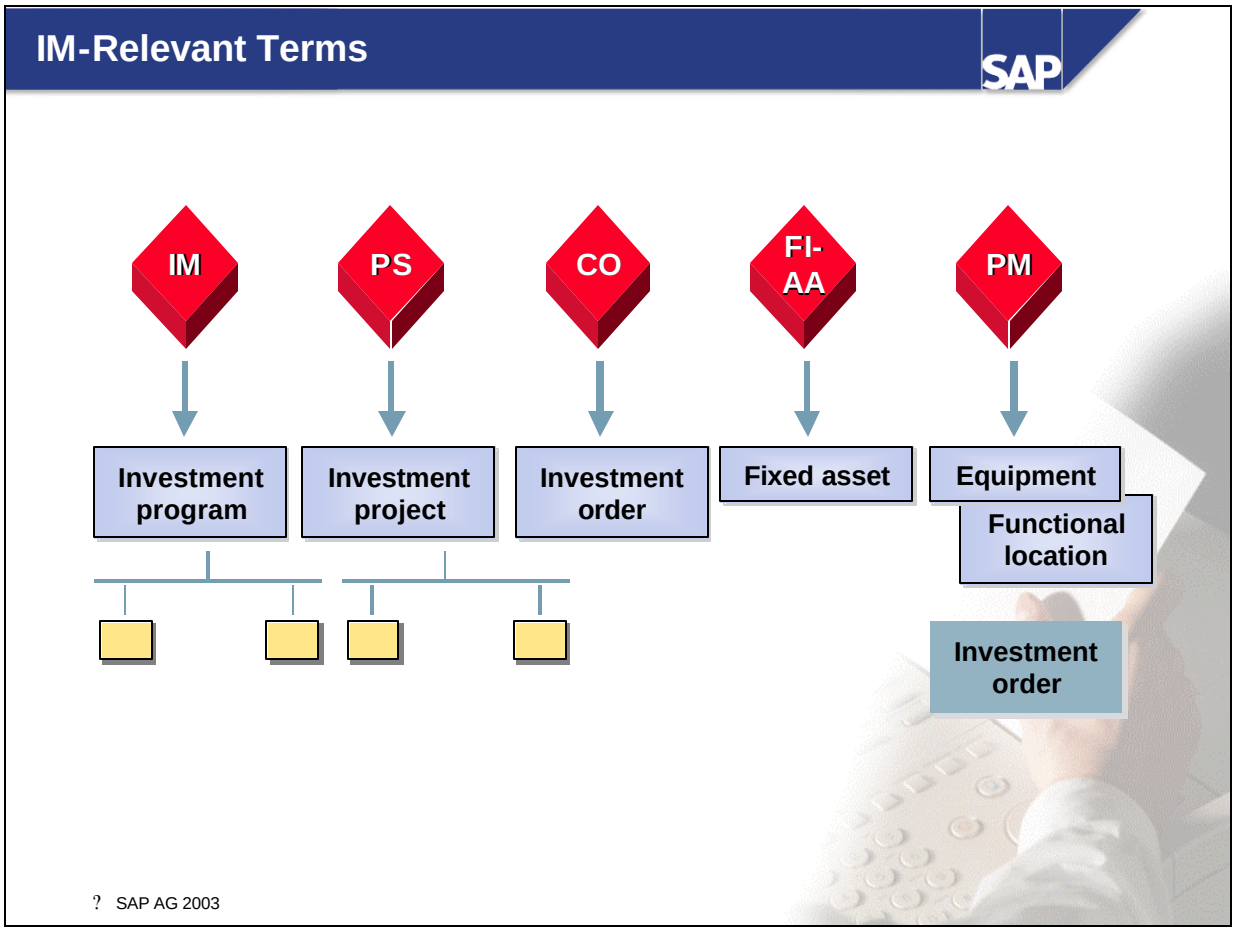

- The Investment Management module has few data objects of its own. Most have been borrowed from other applications.
- Plant Maintenance terms also used in Investment Management include "functional location", which you can enter as an attribute of an investment position and "order", which you can assign to an investment item.

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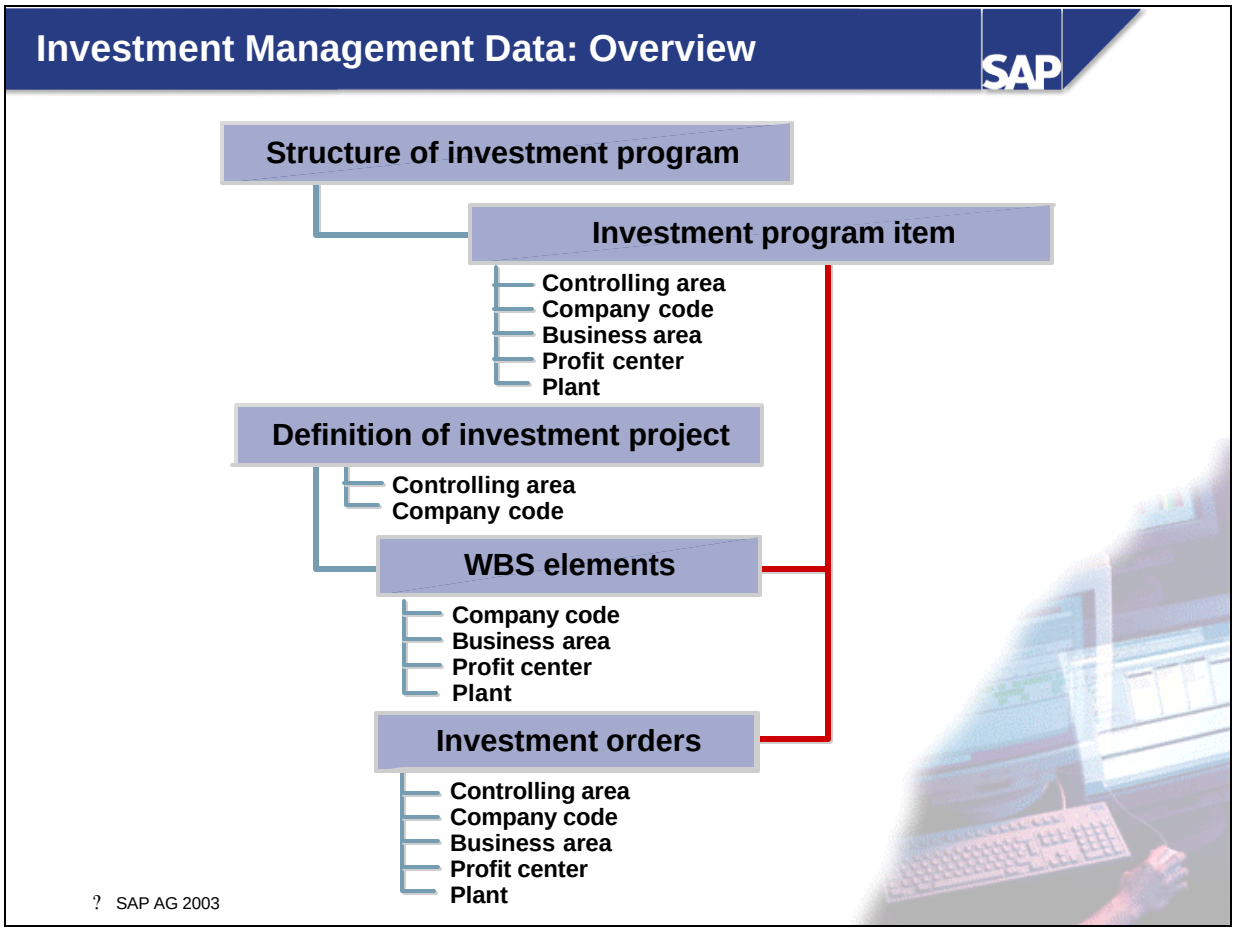

✍ You can make organizational assignments for individual program items, as well as identifying which tasks can be linked to the program item.

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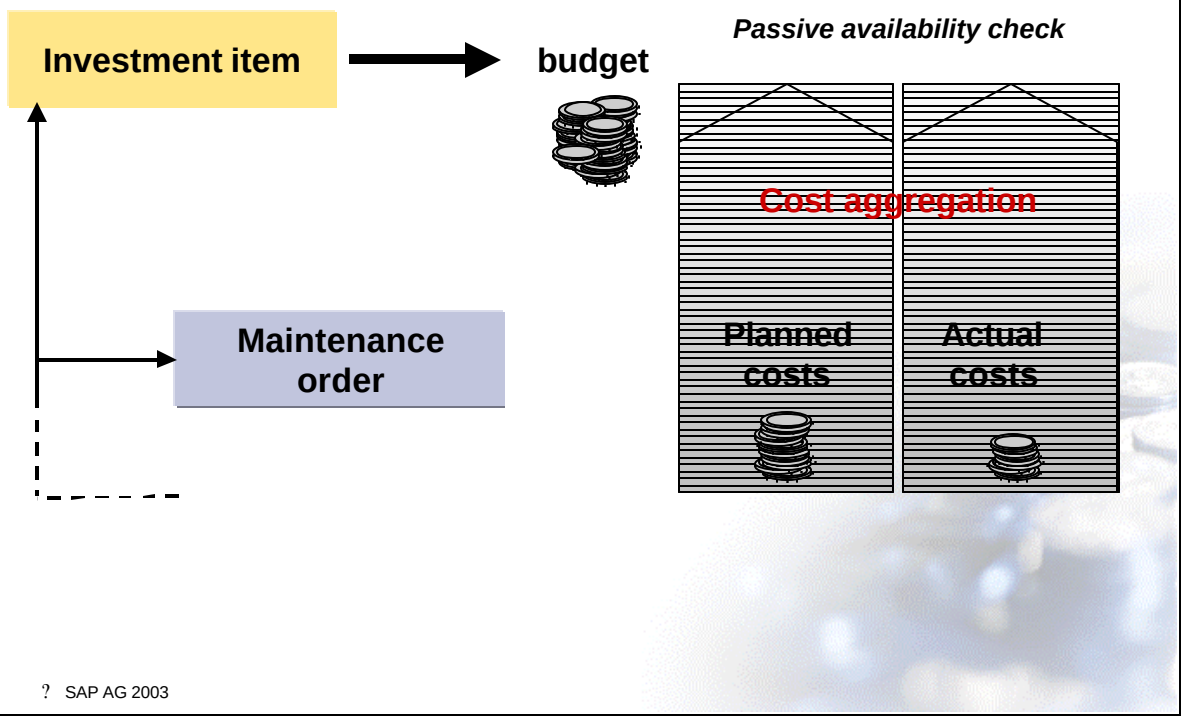
IM-PM: Scenario 1 (Without Budget Distribution)



- This scenario assumes that no active availability check should be made for a budget that has been defined for an investment item, but rather that the funds budgeted should only be compared in the reporting of planned and actual values of the investment measures. Distribution of the budget of an investment item to the assigned maintenance orders is therefore not necessary.
- Planned and actual order costs will be aggregated according to the bottom-up principle using the reporting function in Investment Management and can therefore be compared with the appropriate budget.

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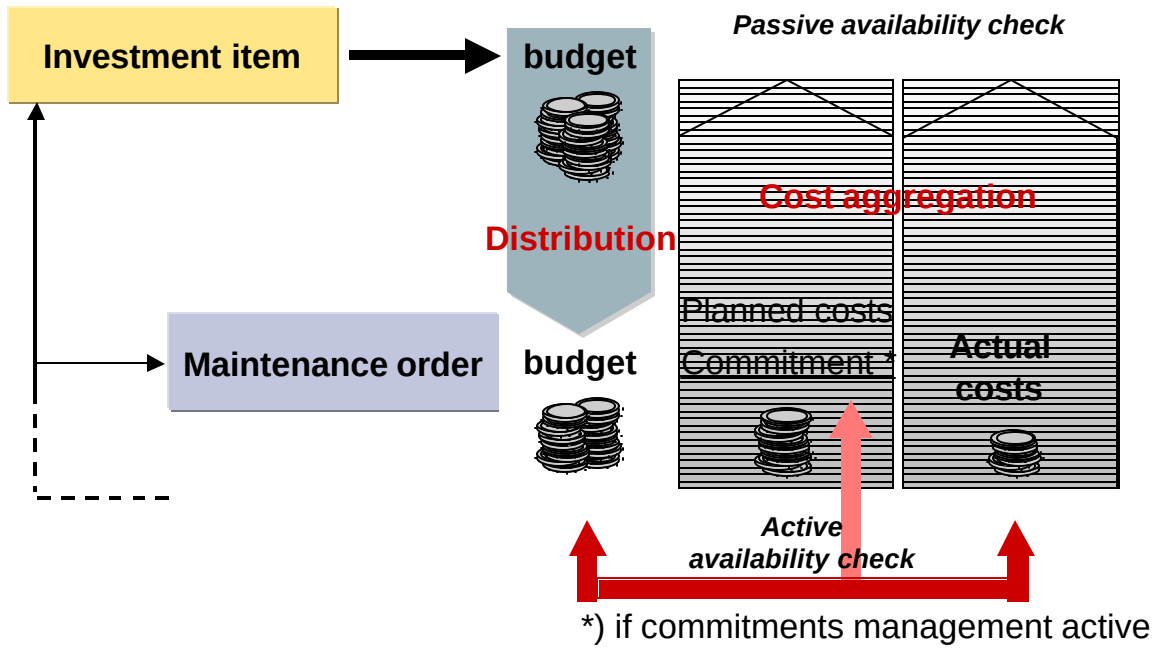
IM-PM: Scenario 2 (with Budget Distribution)



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- This scenario assumes that the budget for an investment item is distributed to the assigned maintenance orders.
  The budget defined at order level is used as the basis for an active availability check that is performed at order level.
  In principle, only the actual order costs are subject to this check - and, if commitments management is active, the share of planned costs for the commitment update.
- As in the first scenario, planned and actual order costs will be aggregated according to the bottom-up principle using the reporting function in Investment Management and can therefore be compared with the appropriate budget.

Example: Analysis of Planning and Budget Deviations

Which organizational areas received a budget of less than 80% of the planned funds?

Plan/Budget Comparison in Program: Overview

Plan/budget comparison in program	Current date 25.05.2002 12:38:21
Investment program	10000
From item *	not assigned
Approved fiscal year	2002

Investment program item		Total Planned	Total Budget	Total Difference
1	Investments EN	44,000.0	40,000.0	4,400.0
11	Administration invest.	22,200.0	22,100.0	0.0
111	Admin.: Buildings	15,100.0	15,000.0	0.0
112	Admin.: Fittings	7,100.0	7,100.0	0.0
12	Production investments	15,000.0	14,000.0	1,000.0
13	Sales investments	7,300.0	3,900.0	3,400.0
2	Investments GB	44,500.0	40,000.0	4,500.0

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- This report provides the following business information:
  The planned value in the R/3 Enterprise Investment Management module represents the funds requested by organizational units for the implementation of their capital investment measures, whereas the budget shows the funds actually approved. The report enables you to see which requested funds were approved in full for which organizational units, where cuts were made and the extent of these cuts.
- There are several reports you can use to for evaluation purposes, such as Analysis of Budget Distribution on Tasks, Analysis of Budget Distribution.

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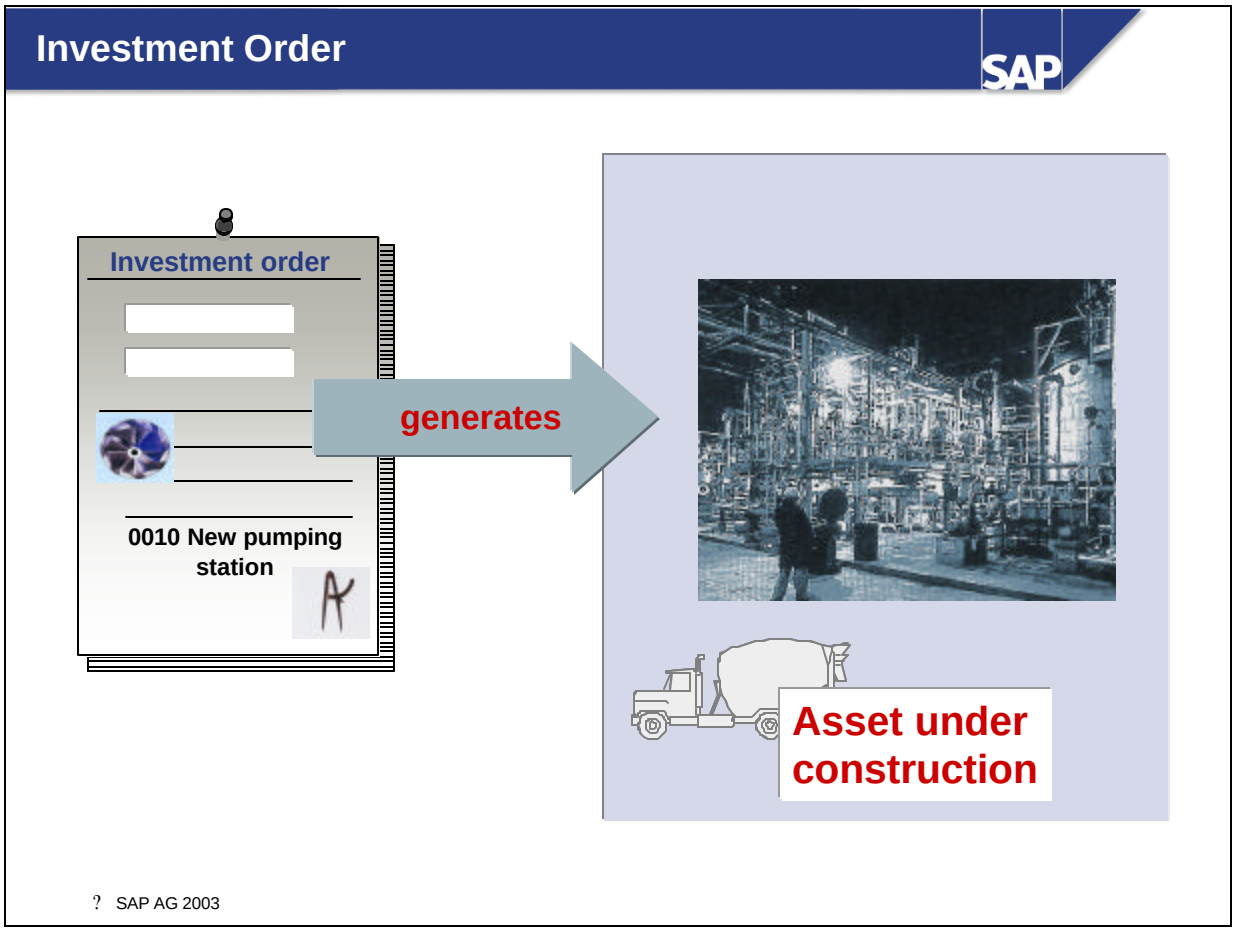

- You use investment orders to help perform tasks that have to be capitalized.
  Example: The maintenance or plant engineer at an automobile production plant wants to represent the construction of a new tool (for example, a press).
- Through the investment order, an asset under construction (AuC) is created with an asset number in Asset Accounting. All the tasks performed are debited to the order for this asset.
- You can maintain the technical system under construction in the order. You can also specify information relevant to an investment reason, investment support measure, or asset evaluation.
- Similarly, you can also simulate depreciation.
- If the asset has been completed, you can create a complete asset in Asset Accounting from the order.

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Settlement of Investment Order

Settlement rule

Distribution rules

- Cost center (settlement type VOR)
- Fixed asset (settlement type AuC)

during the first settlement is created automatically

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- The investment order can be settled in two ways:
  - 100% settlement to the technical system under construction that was generated by the order.
  - Settlement of costs partly to the technical system under construction and partly to a cost center.
- If the only some of the costs are settled to the cost center, the distribution rule for the cost center is created manually before settlement with settlement type VOR (periodic preliminary settlement).
- The distribution rule for a fixed asset is not created manually in either case, but automatically during the first settlement.

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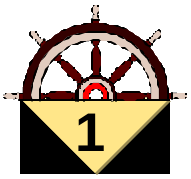
Relevant Settings



Rules for copying an investment program to the order

- Define transfer of investment program
- Assign IM assignment key to order type
- Define fields for IM assignment

Order types and investment management

- Mark order types for investment measures
- Define investment profiles

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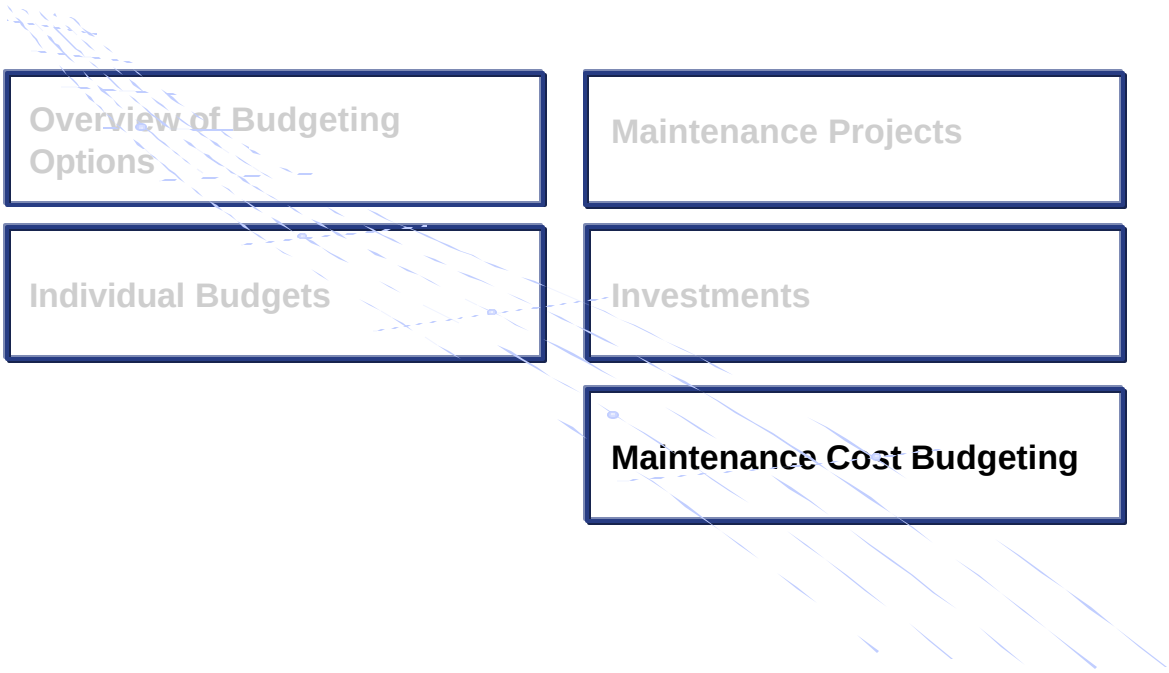
Maintenance Cost Budgeting



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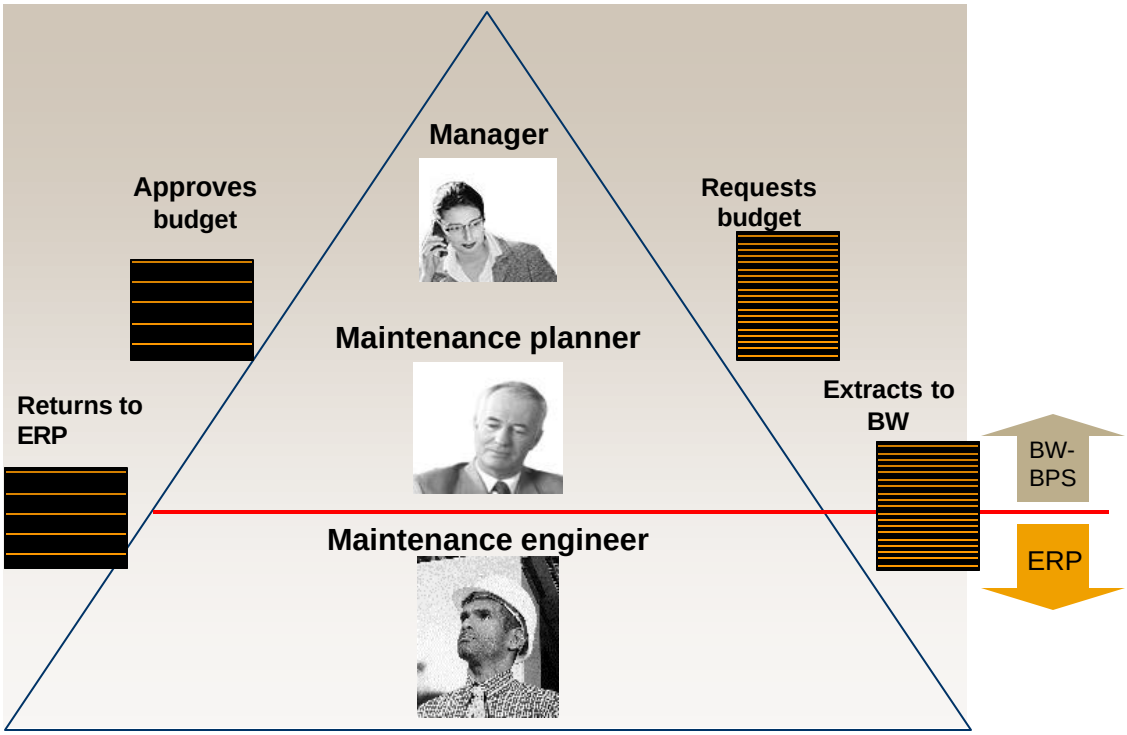
MCB: Planning Process (1)



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- SAP BW-BPS provides functions for budget planning in maintenance and customer service. BW-BPS (Business Information Warehouse – Business Planning and Simulation), formerly SEM-BPS (Strategic Enterprise Management – BPS), allows you to create planning applications. You can develop your own planning application or use the Business Content provided by SAP. In general, a maintenance budget is the budget for all costs incurred for inspecting, maintaining and repairing technical systems for a particular period.
- The necessary data is gathered automatically and made available by MCB in an integrated planning environment. Budget planning can be based on planning-data-based or history-based budgeting.
- The planning process consists of at least the following individual steps:
- The responsible manager/maintenance manager defines one or more planning versions for the budget specification (for example, minimum version, maximum version). Historical data can be used as a basis for your budget planning specification. The manager then sends a version as the budget specification to the responsible maintenance planner.
- The maintenance planner creates a budget proposal based on BW reports made available from extracting maintenance data from SAP ERP EAM for example. The maintenance planner can send back the budget proposal, which is then accepted or rejected by the manager.
- The result of the approval process can then be sent to the ERP system using a BAdi. The proposal serves as the basis for the actual maintenance planning process.

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Roles for MCB

- **MCB Administrator**
  - **Creates/maintains MCB Customizing**
- **Maintenance Manager**
  - **Defines, initiates, monitors, completes the budget planning process**
  - **Existing roles in ERP**
- **Maintenance Budget Planner (or Maintenance Planner)**
  - **Plans the budget for his or her area of responsibility**
  - **Existing roles in ERP**
- **Maintenance Engineer**
  - **Ensures operative maintenance master data is complete and correct**
  - **Existing roles in ERP**
- **BW Operator**
  - **Makes the BW-BPS data basis available**

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- You must carry out different tasks based on your assigned role within your company's maintenance organization. SAP has identified the following roles for the maintenance budget planning process:
  - MCB Administrator: responsible for MCB Customizing to define budget planning processes
  - Maintenance Manager: Defines, initiates, monitors, completes the budget planning process
  - Maintenance Budget Planner: plans the budget for his or her area of responsibility
  - Maintenance Engineer: responsible for ensuring that operative maintenance master data is complete and correct (not an MCB user)
  - BW Operator: responsible for the BW/BPS data basis (not an MCB user)

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Exercises

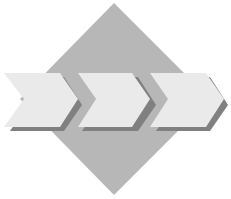
Unit: Budgeting and cost planning

Topic: Individual budgets

At the conclusion of these exercises, you will be able to:

? Assign a budget to a maintenance order

? Describe the effects of the budget



At IDES, each standing order receives a budget for the current fiscal year to keep a lid on expenditure.

3-1 A standing order for small repairs needs a budget for the current fiscal year.

What is the general prerequisite for allocation of a budget?

_____

_____

_____

3-2 Create the standing order for the current fiscal year (to begin with, without release).

What number is assigned?

_____

_____

3-3 Allocate a budget of 10,000 to your standing order.

How do you proceed?

What happens when you allocate the budget?

_____

_____

_____

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3-4 Plan internal and external operations.

Which costs are checked against the order budget?

_____

_____

_____

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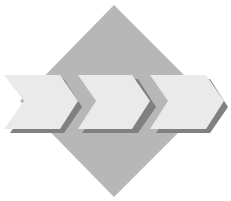
Unit: Budgeting and cost planning

Topic: Maintenance projects

At the conclusion of these exercises, you will be able to:

- ? Assign a maintenance order to a project
- ? Verify the budget of a WBS element
- ? Control the budget monitoring of maintenance orders for the project
- ? Monitor maintenance costs for the project



At IDES, complex maintenance tasks should be controlled and monitored using projects.

For this purpose, the maintenance orders, which represent the part steps, are assigned to a WBS element.

4-1 The modification of clarification plant ## should be processed using a project that is sub-divided into two larger projects: Mechanical and electrical work.

Display the structure of project I/5000.

How do you proceed?

_____

_____

_____

4-2 During mechanical work, the maintenance department must erect scaffolding. Plan a maintenance order for this with order type PM01 and schedule the relevant operations.

Assign this order to the WBS element *Modification biological purification – mechanical work*.

How do you proceed?

What are you asked?

_____

_____

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4-3 Maintain a suitable settlement rule for the order.

How do you proceed?

Put the order in process. Which order number is assigned?

_____

_____

_____

4-4 Check the planned costs for the order.

Which costs have been calculated?

Check whether these planned costs also appear at WBS element level. How do you proceed?

_____

_____

_____

4-5 Check the budget for the project. What is the total budget for the WBS element? What is the budget for the current fiscal year?

_____

_____

_____

4-6 Which costs for maintenance orders can be checked against the budget for the WBS element?

_____

_____

_____

4-7 Enter a time confirmation for your order and then check the cost situation for order and project.

How do you proceed?

_____

_____

_____

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4-8 Settle the order to the WBS element.

How do you proceed?

_____

_____

_____

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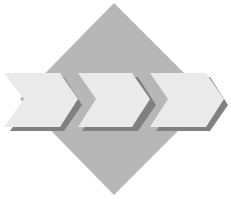
Unit: Budgeting and cost planning

Topic: Investments

At the conclusion of these exercises, you will be able to:

? Create investment orders



Individual investment orders should be created for particular tasks which must be capitalized.

5-1 The new development of a sand trap within the mechanical cleaning of your clarification plant ## should be processed using a separate investment order.

Use order type PM07 to configure an investment order for this purpose and generate an asset under construction with the following values:

Investment profile	000001
Scale	2
Investment reason	40
Environmental protection investment	20000

How do you proceed?

Which asset number is assigned?

_____

_____

_____

5-2 Describe the additional steps for processing the investment order.

_____

_____

_____

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Unit: Budgeting and cost planning

Topic: Individual budgets

3-1 A budget profile must be assigned to the order type. You define this in Controlling, and assign it as follows in PM Customizing:

Plant Maintenance and Customer Service ? Maintenance and Service Processing ? Maintenance and Service Orders ? Functions and Settings for Order Types ? Configure Order Types

3-2 ***SAP menu ? Logistics ? Plant Maintenance ? Maintenance Processing ? Order ? Create (General)***

3-3 ***SAP menu ? Logistics ? Plant Maintenance ? Maintenance Processing ? Order ? Budget ? Original Budget ? Change***

Budget effect: System status BUDG is set at order header level. In the *Costs* tab page in the order, you can use the *Report budget/commts* button to see the budget.

3-4 In the planned costs area, only those costs that result in a commitment are checked against the budget. In this case, commitment management must have been activated for the order type.

In the actual costs area, all resource consumption (services/materials) is checked against the budget.

If the budget is exceeded when you post actual costs, the budget must be supplemented. You can use transaction COFC to perform follow-up posting for missing actual costs.

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Unit: Budgeting and cost planning

Topic: Maintenance projects

4-1 ***SAP menu*** *?* ***Logistics*** *?* ***Project System*** *?* ***Project*** *?* ***Special Maintenance Functions*** *?* ***Structure Planning*** *?* ***Display Project***

Project I/5000

WBS element I/5000-1 modification of clarification plant

WBS element I/5000-1-1 modification of pumping station

Network 903159 modification of pumping station

WBS element I/5000-1-1-1 Mechanical work

WBS element I/5000-1-1-2 Electrical work

WBS element I/5000-1-2 Modification of biological purification

WBS element I/5000-1-2-1 Mechanical work

WBS element I/5000-1-2-2 Electrical work

4-2 ***SAP menu*** *?* ***Logistics*** *?* ***Plant Maintenance*** *?* ***Maintenance Processing*** *?* ***Order*** *?* ***Create (General)***

Order entry

Order type: PM01

Reference object: Functional location ##

Additional data tab page, WBS element field

>> I/5000-1-2-1

You are asked whether the dates for the WBS element should be transferred.

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4-3 In the order header, *Settlement rule* button;

delete the standard rule; then make the following entries:

Field Name or Data Type	Values
Cat.	WBS
Settlement receiver(s)	I/5000-1-2-1
%	100
Settlement type	PER

Another line can be added with the same data, but which is used as settlement type TOT (total). This is used for complete settlement of the order, if settlement is not always periodic.

4-4 ***SAP menu ? Logistics ? Plant Maintenance ? Maintenance Processing ? Order ? Change***

Costs tab page

SAP menu ? Logistics ? Project System ? Information System ? Tools? Hierarchy reports ? Report ? Execute

Double-click Plan/Actual/Variance

Enter and execute project I/5000 and WBS element I/5000-1-2-1

4-5 ***SAP menu ? Logistics ? Project System ? Financials ? Budgeting ? Original Budget ? Display***

Field Name or Data Type	Values
Total budget (*Total* button)	1,500,000
Budget current year (*Year* button)	500,000

4-6 Both the planned and actual costs for the orders are checked against the budget. External costs are checked, as are costs for external services and materials.

Note that the budget for the WBS element is not visible in the order.

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4-7 ***SAP menu*** *?* ***Logistics*** *?* ***Plant Maintenance*** *?* ***Maintenance Processing*** *?* ***Completion Confirmation*** *?* ***Entry*** *?* ***Individual Time Confirmation or Collective Time Confirmation*** *?* ***With Selection***

then

SAP menu *?* ***Logistics*** *?* ***Plant Maintenance*** *?* ***Maintenance Processing*** *?* ***Order*** *?* ***Change***

Costs tab page

SAP menu *?* ***Logistics*** *?* ***Project System*** *?* ***Information System*** *?* ***Tools***? ***Hierarchy reports*** *?* ***Report*** *?* ***Execute***

Double-click Plan/Actual/Variance

Enter and execute project I/5000 and WBS element I/5000-1-2-1

4-8 ***SAP menu*** *?* ***Logistics*** *?* ***Plant Maintenance*** *?* ***Maintenance Processing*** *?* ***Completion*** *?* ***Individual Processing*** *?* ***Settle***

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Unit: Budgeting and cost planning

Topic: Investments

5-1 ***SAP menu*** *?* ***Logistics*** *?* ***Plant Maintenance*** *?* ***Maintenance Processing*** *?* ***Order*** *?* ***Create (General)***

Order type: PM07

Reference object: Functional location ##

Investment tab page; enter the specified parameters; then *Asset under construction* button

or

Release order >> Asset under construction as well as system status AUC in the order header are created automatically.

Important: The settlement rule (type: ANL, settlement type AUC) is created automatically with the first settlement.

5-2 The investment order is debited with the costs (= times and materials) for the new development. The processing here works in the same way as for the standard order.

If the work is finished, a complete asset is generated from the order (*Investment* tab page). This leads to the automatic creation of a distribution rule in the investment order (settlement rule with account assignment category ANL and newly generated asset number as receiver).

Finally, the order is settled to the completed asset (asset is activated). This is done when the order is settled again using processing type *Whole.* The values from the asset under construction are allocated to a completed asset.

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Business Intelligence

- Reporting in the Logistics Information System (LIS)
- Reporting in the Business Information Warehouse (BW)
- Maintenance cost budgeting

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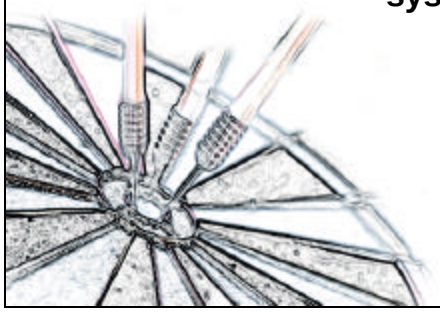
Unit Objectives

At the conclusion of this unit, you will be able to:

- **Describe data warehouse concepts**
- **Explain the principle of cost updates**
- **Perform standard analyses**
- **Describe the business content of Plant Maintenance in BW**
- **Roughly explain the data flow from a source system into BW and the data model in BW**



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Course Overview Diagram

Course Overview

Settlement of Orders

Introduction

Budgeting and Cost Planning

Costs in maintenance process

Business Intelligence

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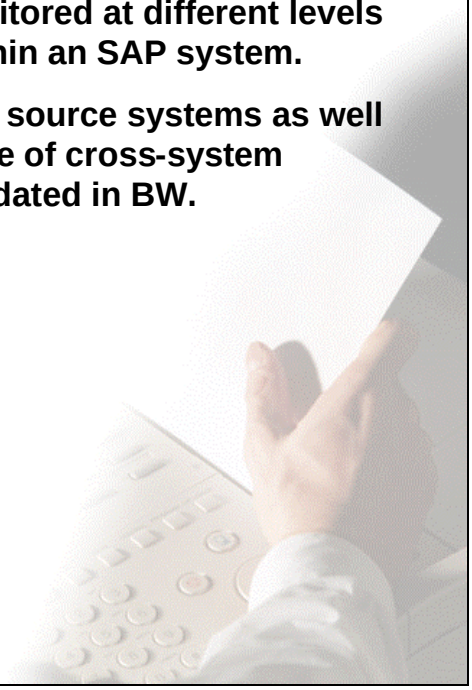
Business Scenario

- The development of costs, damage and breakdowns should be monitored at different levels using existing analyses within an SAP system.
- Different data from different source systems as well as their use within the scope of cross-system analyses should be consolidated in BW.



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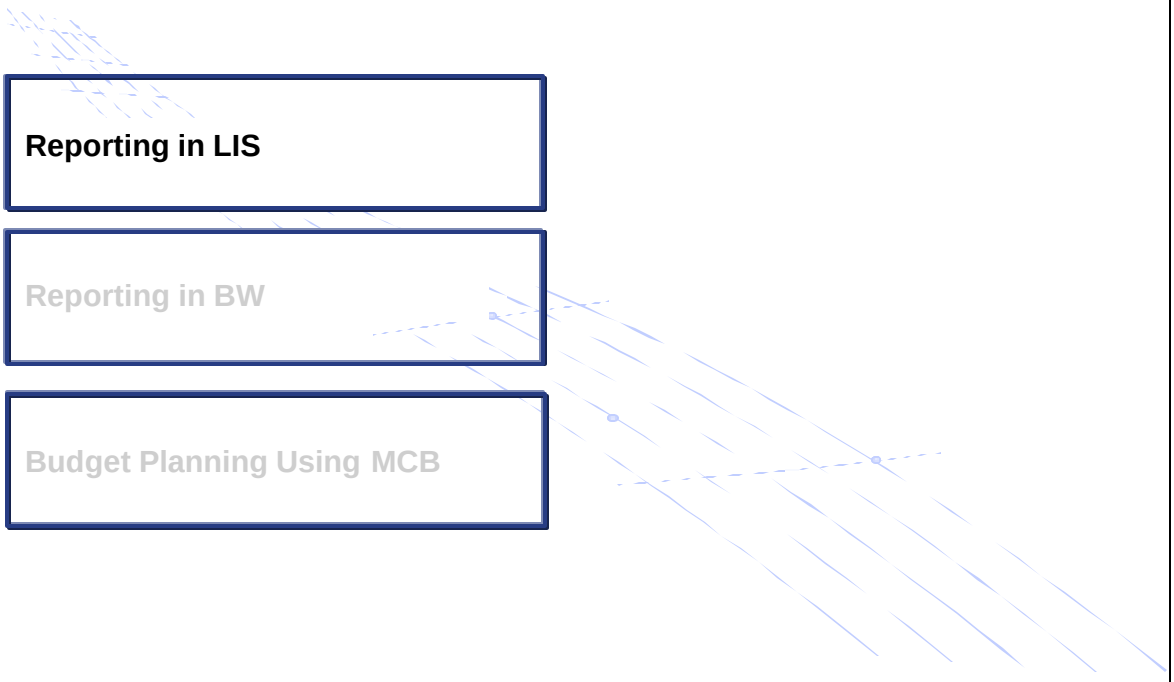
Reporting in LIS



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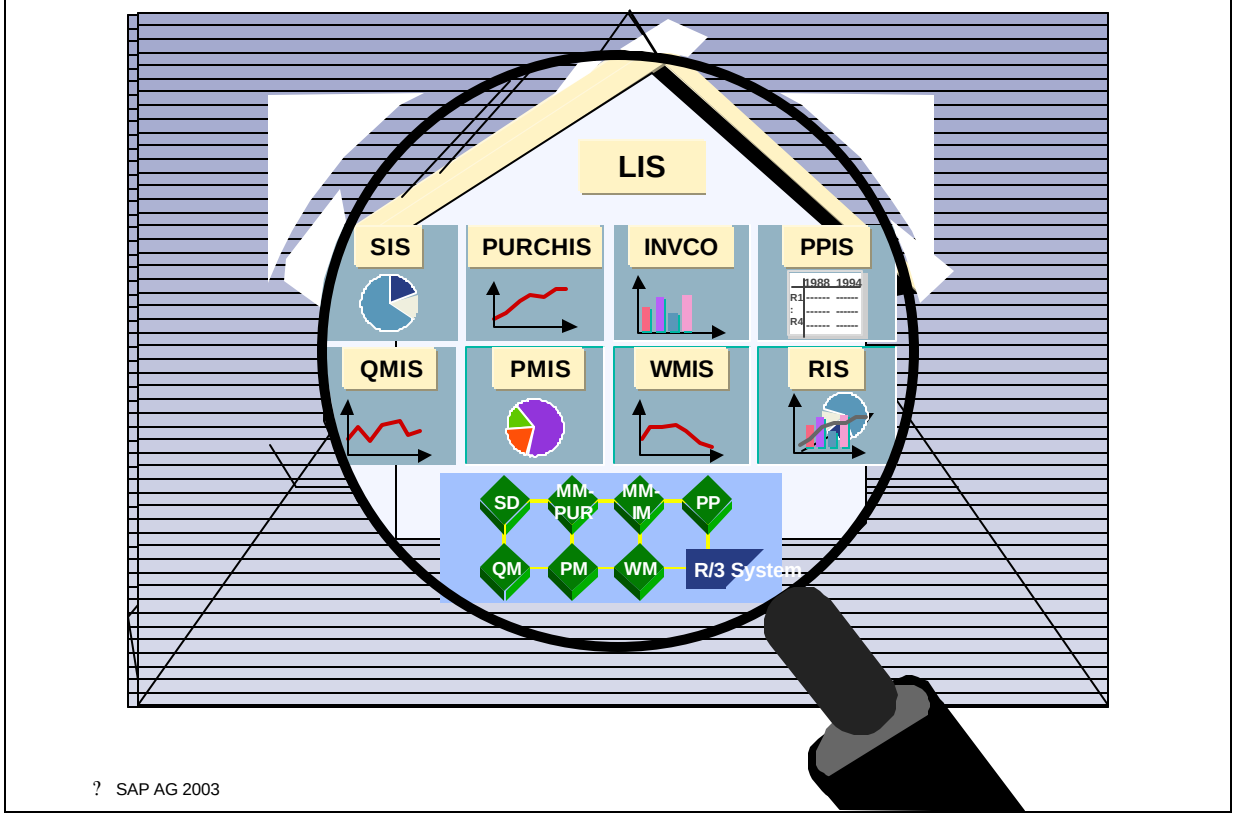
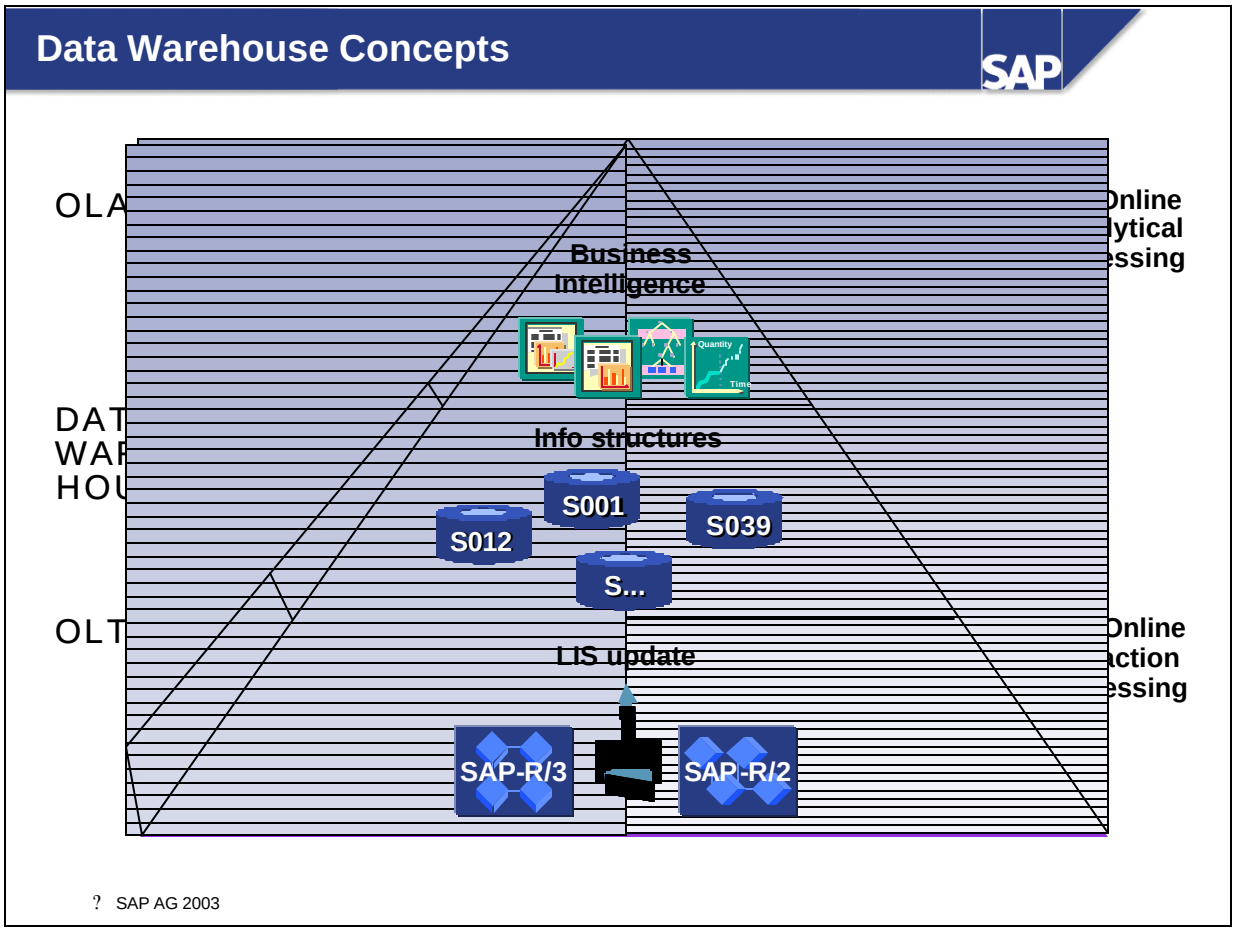
Logistics Information System (LIS)



- SAP Logistics offers a range of application-related information systems, all of which have the same user interface and comparable basic functionality.
  The way in which data is stored is identical in all Logistics Information Systems. A range of special tools and working methods serve to underline the typical character of a Data Warehouse in the Logistics Information System.
- Individual Logistics Information Systems include:
  - SIS Sales Information System
  - PURCHIS Purchasing Information System
  - INVCO Inventory Controlling
  - WMIS Warehouse Management Information System
  - PPIS Production Planning Information System
  - QMIS Quality Management Information System
  - PMIS Plant Maintenance Information System
  - RIS Retail Information System



- Newer Data Warehouse concepts use a triple-level model strategy for implementing more efficient integrated information systems.
- The three levels sub-divide the entire data flow from data acquisition in operational systems to the presentation of information.
- Operational, integrated applications in OLTP systems are the basis for data acquisition. Large quantities of master and process data occur in these systems, the presentation of which is ultimately to be improved using information systems.
- Application data is condensed into a small number of detailed key figures and managed separately in the database tables of a Data Warehouse system.
- A number of analysis tools are available in a third step for evaluating the statistical data obtained.
- These tools offer various analysis options and provide an efficient instrument for rapid decision-making in modern management.

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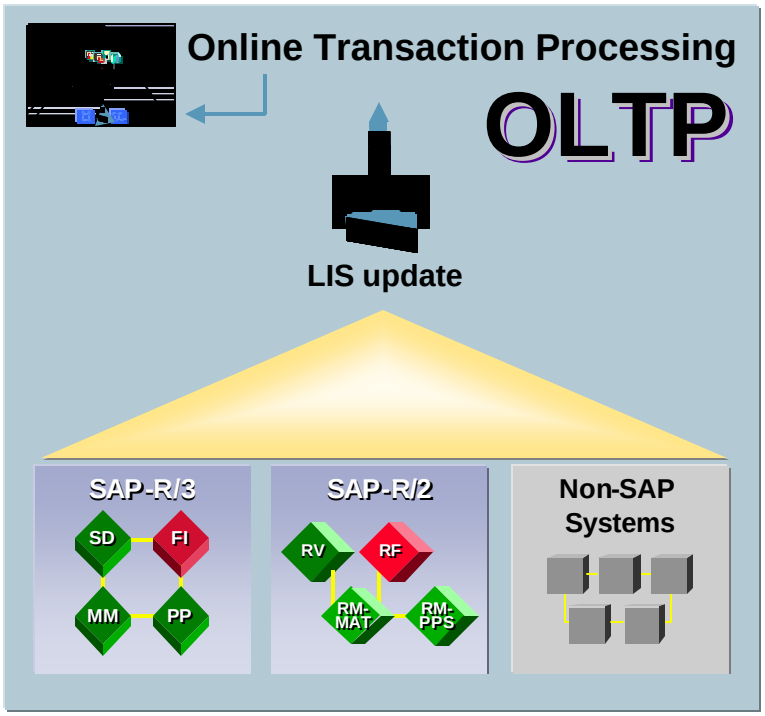
Online Transaction Processing



- **LIS update for processing operational data**
  - **Extraction**
  - **Aggregation**
  - **Key figure calculation**
- **OLTP systems**
  - **Mapping business processes**
  - **Managing master and operational data**

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- R/2 and R/3 modules, as well as modules from non-SAP systems, are possible as integrated application modules at OLTP level.
- Large quantities of data accumulate in the system from the mapping of business processes.
- Special update modules are used to anchor the logistics information systems to the SAP R/3 OLTP applications. The LIS update function uses data aggregation to implement one of the most important basic principles of the entire LIS concept.
- Update programs reduce the amount of operational data to its statistically-relevant parts. They compress data using periodical and object-related accumulation procedures and calculate meaningful key figures from the operational data using formulas and relationships.
- The updating of statistical data for the LIS can run parallel to the processing of operational data to ensure the consistency between the LIS information and data in operational applications. The update can also take place periodically to reduce system overload in the application systems.
- The LIS components in R/3 have also been coupled with external OLTP systems.
- This means that operational data from an SAP R/2 application can subsequently be transferred to the LIS update programs of an SAP R/3 System, enabling LIS to be used as an R/3 OLAP application for an R/2 OLTP system.

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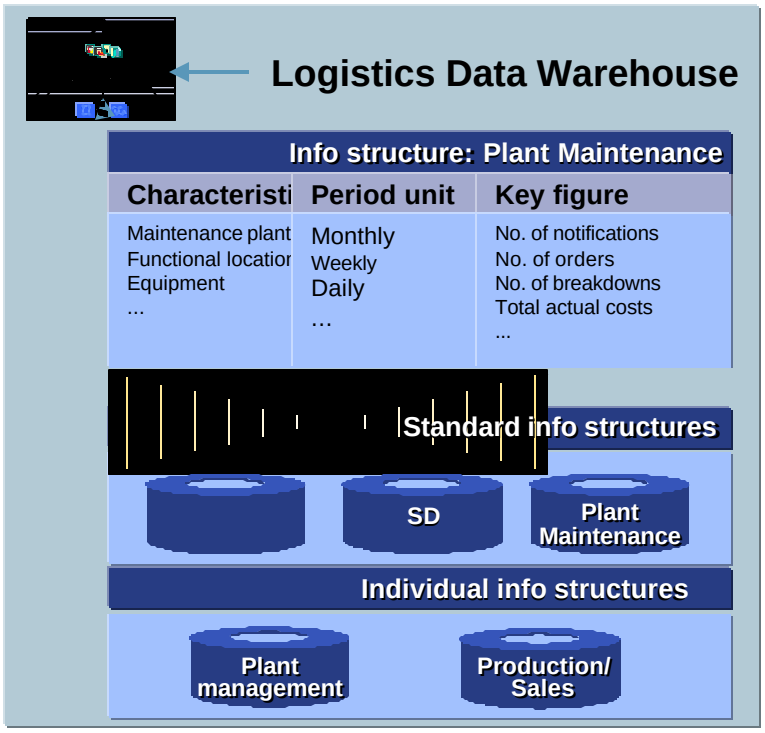
Logistics Data Warehouse



- **Info structures**
  - **Transparent**
  - **Aggregation criteria**
    - Characteristics
    - Period unit
  - **Measurable quantities**
    - Quantitative key figures
    - Qualitative key figures
  - **Diverse info structures in standard system**
  - **Straightforward tools for creating individual info structures**

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- The individual physical tables of the Logistics Data Warehouse are described as information structures and clearly described in the SAP Data Dictionary. Information structures (or info structures) have a typical structure.
- Analysis objects from the real world are transferred as evaluation groups to the info structures as **characteristics**. Statistical information is updated for characteristics, such as **functional locations** or **equipment** in aggregated form. **Organizational elements**, such as **location**, **plant section** or **maintenance planner group** are used as characteristics in info structures.
- The **time-base** offers another possibility for aggregating data. Data is compiled for each period and for each characteristic. With regard to the period unit, you can choose between daily, weekly and monthly data compression.
- Logistics key figures are updated for each characteristic combination and period unit. These include quantitative amounts that provide information about measurable subjects. **Key figures** can be ascertained for each evaluation group through accumulation, such as **actual costs**, or they can be simple counters, such as **number of orders**.
- Info structures are available in the standard SAP System for a number of application areas. Easy-to-use tools enable you to group characteristics and key figures into individual info structures according to your own criteria and supply them with data using separate update programs.

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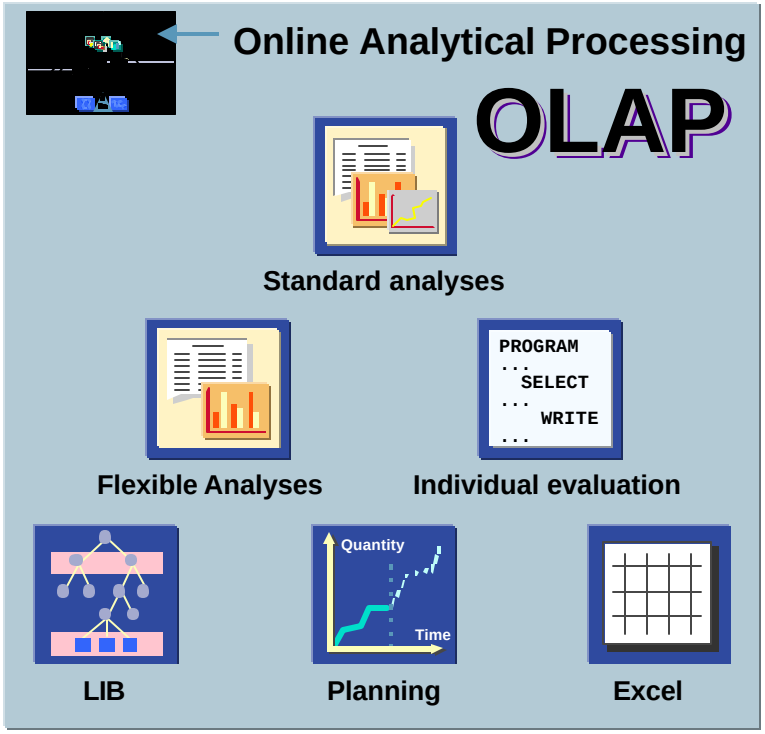
Online Analytical Processing



- **Standard analyses**
  - Numerous statistical functions
  - Free navigation
- **Flexible Analyses**
  - Controllable layout
  - Formula derivation
- **Individual evaluations**
  - Logical databases
  - ABAP/4
- **Logistics Information Library**
  - Classification of key figures
  - Retrieval functions
- **Planning**
  - Distribution functions
  - Interactive graphics
  - Forecast support
- **Non-SAP resources**
  - Native SQL
  - Excel

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- A number of different **online analysis** methods are provided by the Data Warehouse at **Business Intelligence** level.
- **Standard analyses** offer a variety of analysis perspectives, support numerous statistical functions, allow free navigation and facilitate the enrichment of statistical data with background data from the operational systems at OLTP level.
- **Flexible analyses** can be generated using reporting tools, according to the criteria you have defined. These analyses have a variable list layout and, like standard analyses, can be represented graphically.
- Moreover, all forms of individual evaluation and processing of warehouse information are possible using SAP ABAP/4, as the data is stored in clear and accessible form in the Logistics Data Warehouse.
- In addition to the actual costs from operational applications, planning data can also be managed in different versions in the Logistics Data Warehouse. Special planning tools support you with distribution functions, interactive graphic and forecasting techniques when entering planning data. Planned/actual comparisons can be processed using standard analyses.
- The Logistics Data Warehouse is an open system and also allows analyses to be performed using non-SAP tools, such as Excel or native SQL.

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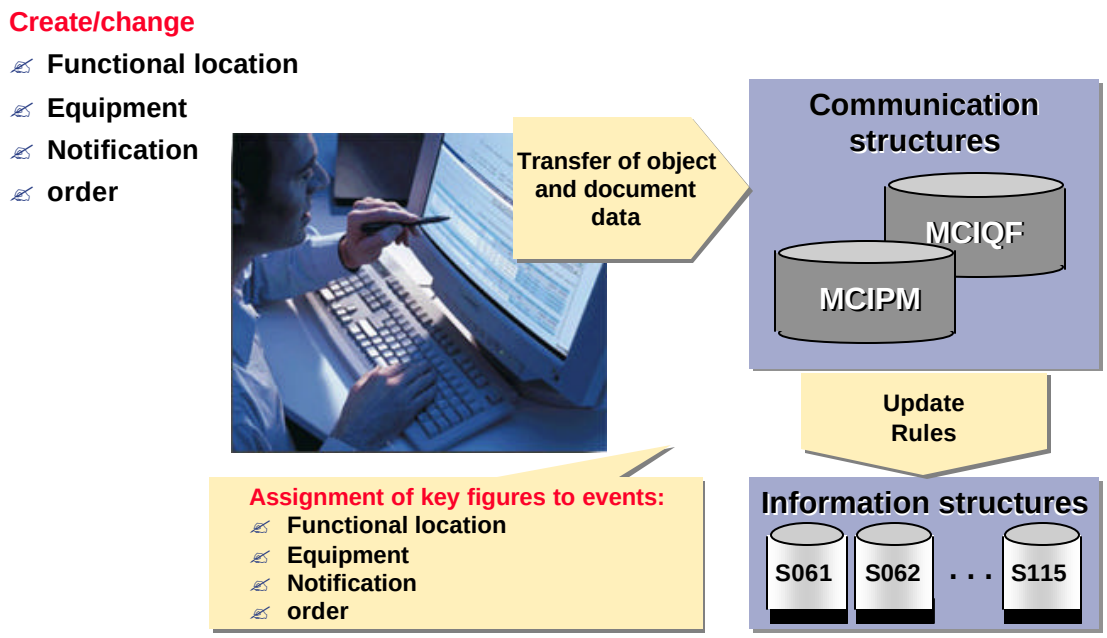
Plant Maintenance Information System: Events in Updating Key Figures



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- Object and document data are transferred to the interface between the application and information system when you end the relevant editing function - create/change with subsequent saving.
- The communications interfaces only make the data available within the program, that is, there is no permanent location for data storage.
- The update program of the respective information structure records the relevant data for the corresponding key figure and updates it in the respective information structure. The data updated here is permanent and is available for the relevant standard analysis and every other evaluation tool (flexible analysis, ABAP/4 and so on).

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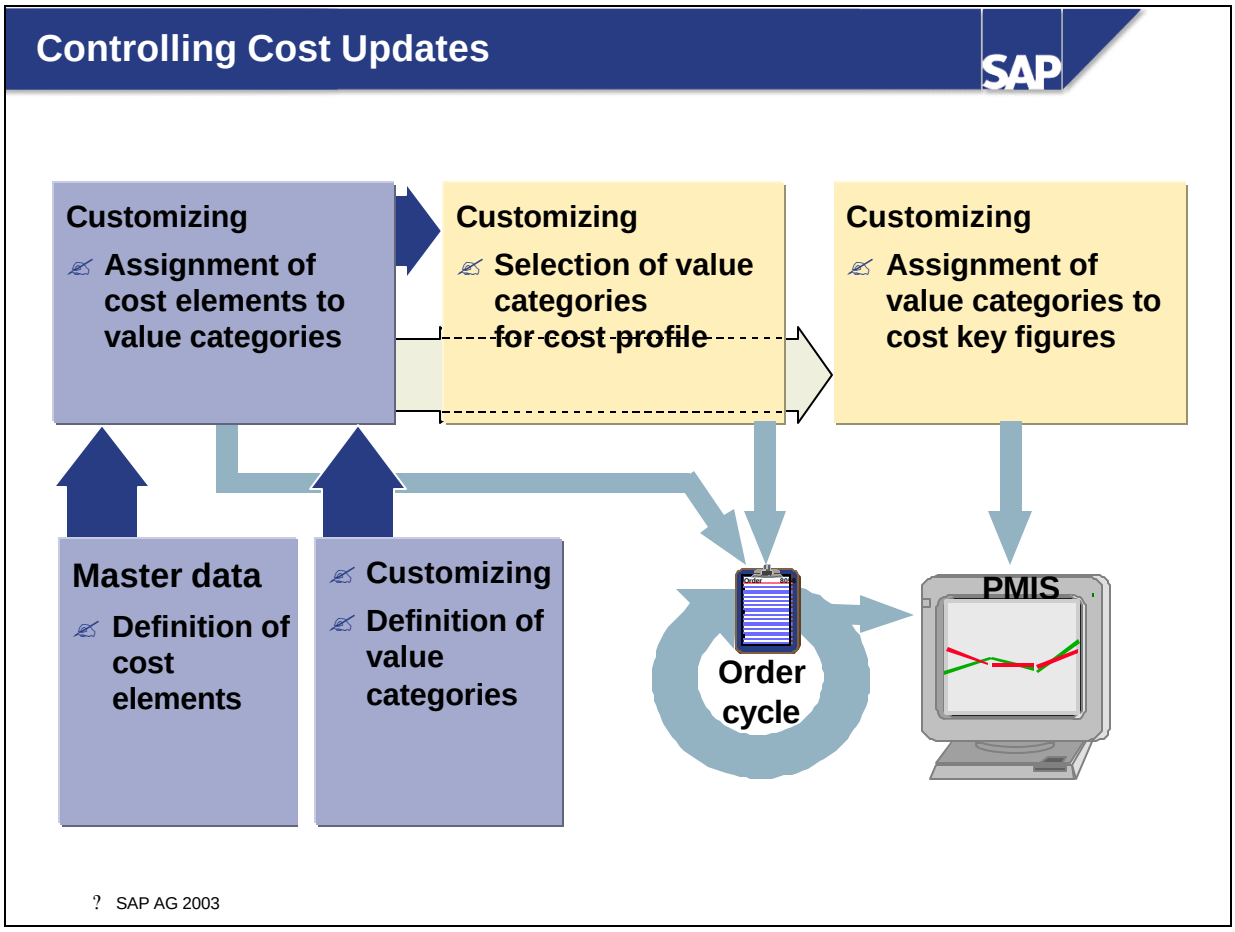

- Maintenance costs are updated by the following key figures in the information structures S061, S062, S065 and S115:
  - Total costs planned
  - Total costs (actual)
  - Internal labor costs
  - Internal material costs
  - External labor costs
  - External material costs
  - Service costs
  - Other costs
- The key figures for total costs are summarily updated independently of all other criteria to provide the planned and/or consumed resources for an order.
- Updates to the other six key figures refer to the actual costs for an order and may be differentiated using value categories.
  In Customizing, you can control which value categories are relevant for updating which key figures.

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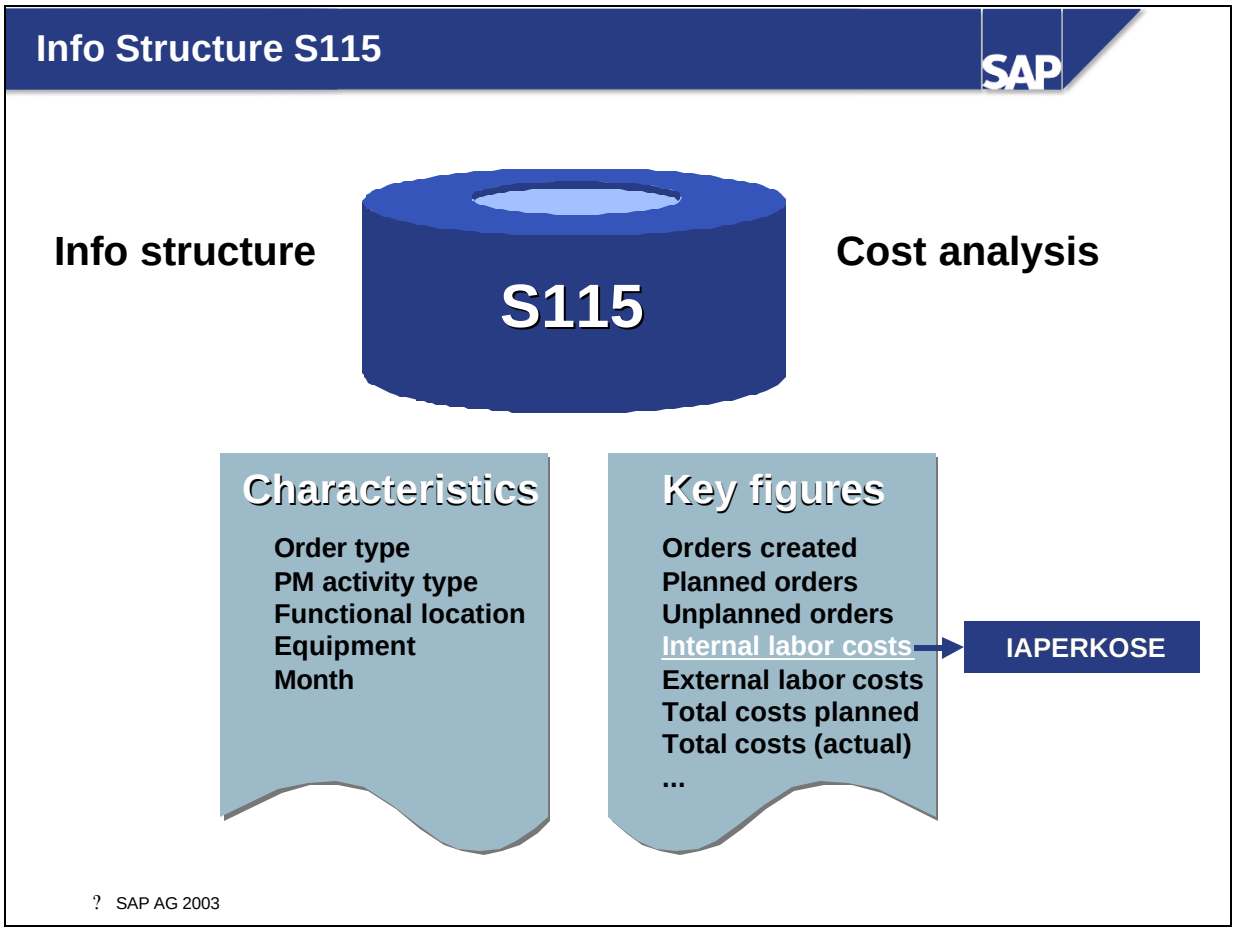

- Info structure S115 contains the characteristics order type, PM activity type, functional location, equipment and month.
- Info structure S115 also contains all PM cost key figures as well the key figures for created, planned and unplanned orders.
- Standard field catalogs provide the info structure with characteristics and key figures.
- The field catalogs refer to the communication structures.

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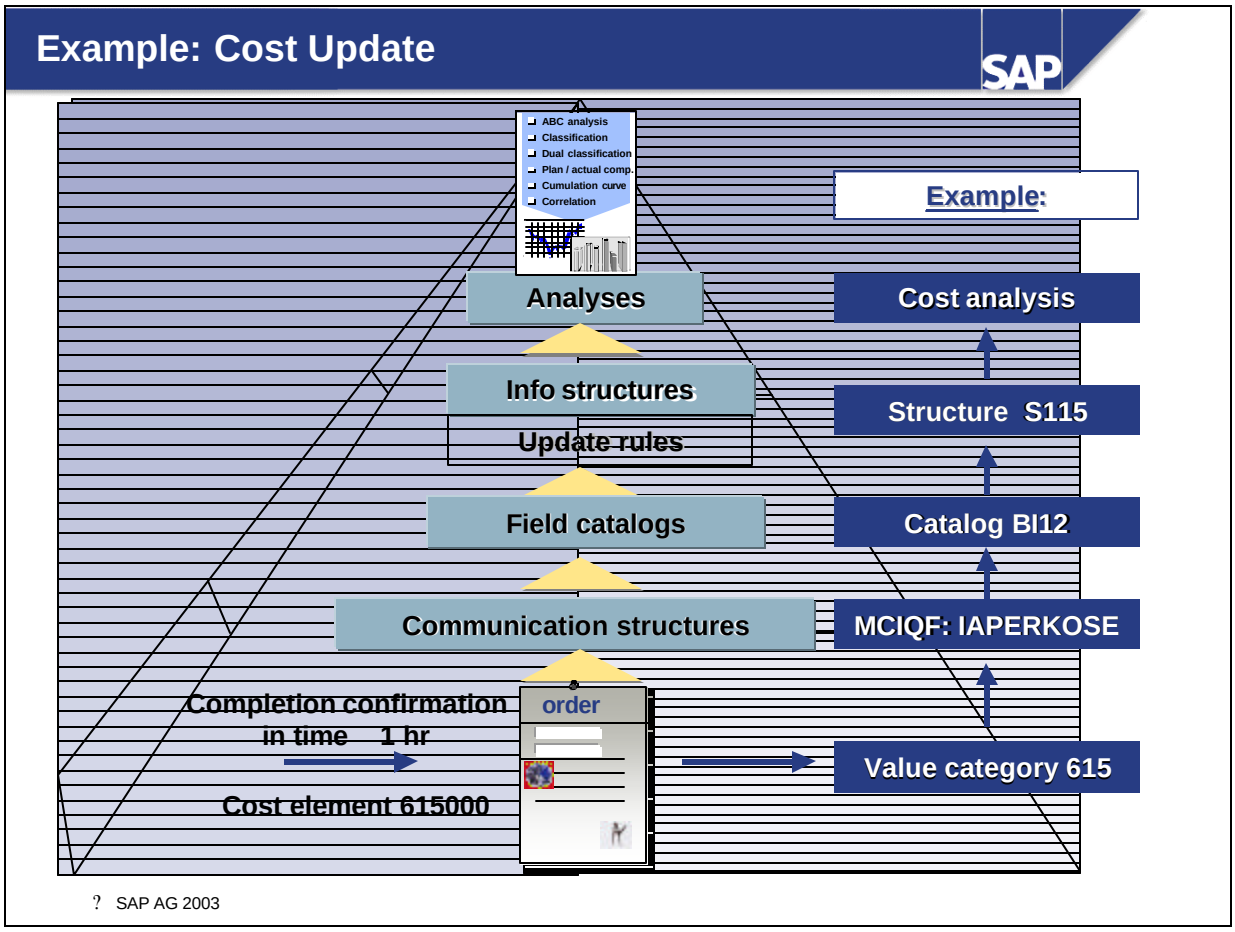

- The maintenance order is debited with the completion confirmation in time. The cost element that is assigned to the activity type (CO) is debited.
- The cost element is assigned to a value category here 615). The value category is in turn assigned to a key figure (such as internal personnel costs IAPERKOSE).
- The key figure here IAPERKOSE) is part of the communication structure here MCIQF) and is provided by a standard field catalog here BI12) for the creation of information structures.
- The information structure (here S115) consists of a combination of characteristics and key figures with a time reference.
- A standard analysis is based on the information structure.

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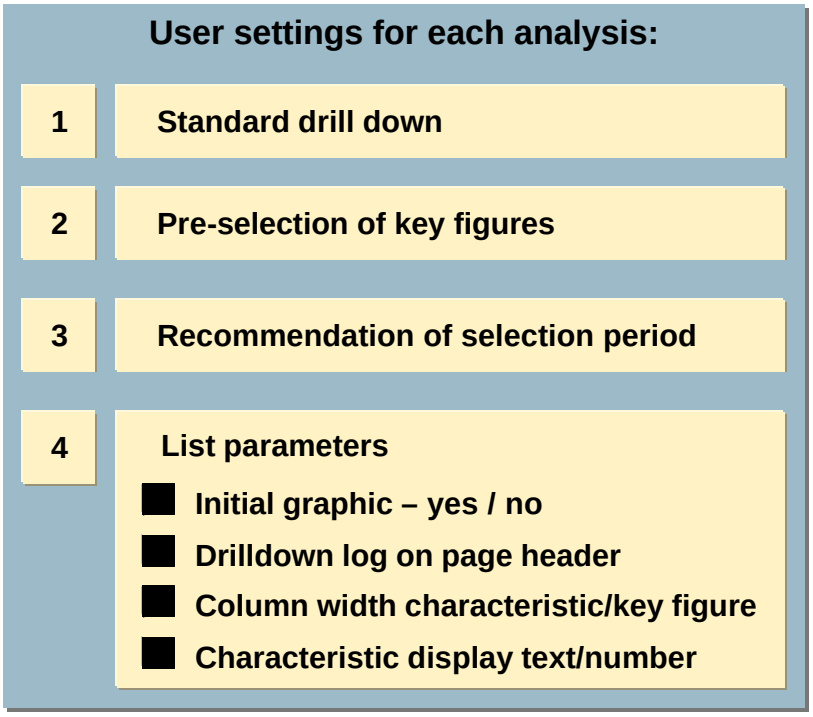
Default Settings



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- You can make default settings centrally for each standard analysis that are valid for each user.
- These default settings may also be controlled user-specific.
- You can predefine the standard drilldown, a presentation of key figures, the default value for a selection period and different list parameters for designing the list layouts.
- You can subsequently change the key figure selection and list layout design in the standard analyses.

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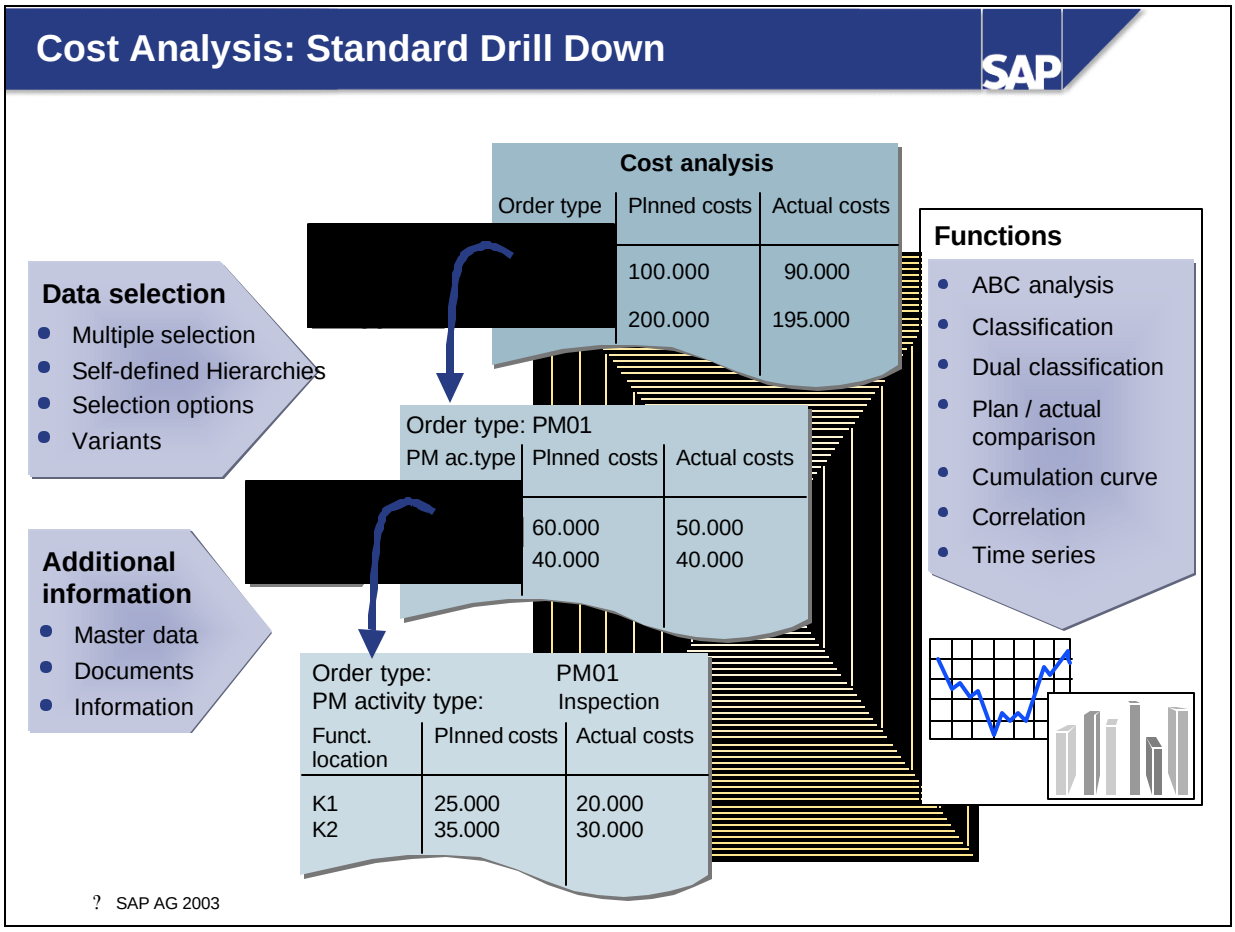

- **Standard analyses** offer extensive functions for generating wide-ranging presentations and analyses from the database in the LIS.
- The database for a standard analysis is set by defining the analysis object (for example, purchasing group, vendor or material group) and by setting default selections.
- The data can then be displayed in a structured form using an initial list, together with different drilldown lists. Individual analyses can be archived.
- Master data or documents can be displayed using standard application transactions from the different explosion levels.
- A number of special functions are available for individual analysis of the key figures and characteristics attributes, on which an analysis is based. All functions for evaluating statistics are supported graphically.

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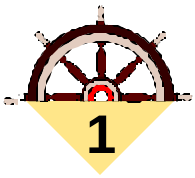
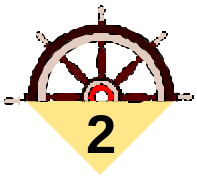
Relevant Settings



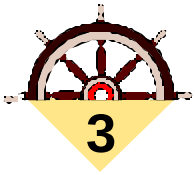
Update currency

- Definition of currency for maintenance statistics



Updating of cost key figures

- Assignment of value categories to cost key figures



Customer-specific key figures

- Definition of customer-specific key figures

Customizing

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Reporting in BW

Reporting in LIS

Reporting in BW

Budget Planning Using MCB

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Business Information Warehouse (BW): Architecture

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- The **Business Information Warehouse (BW)** is a self-contained, independent system, which aims to extract data out of various source systems (both SAP and non-SAP systems), giving them a new structure and combining them into meaningful analyses with an attractive layout.
- The central element is the SAP BW Server, which is preconfigured with the **Business Content** of the various business areas.
- Business Content encompasses role- and function-based information models that are based on consistent meta data. The Business Content provides the information needed by a specific role or function in its everyday work.
- The **Business Explorer** makes available flexible reporting tools that can be used for strategic analyses and decision making. The most common form is the **Query.**

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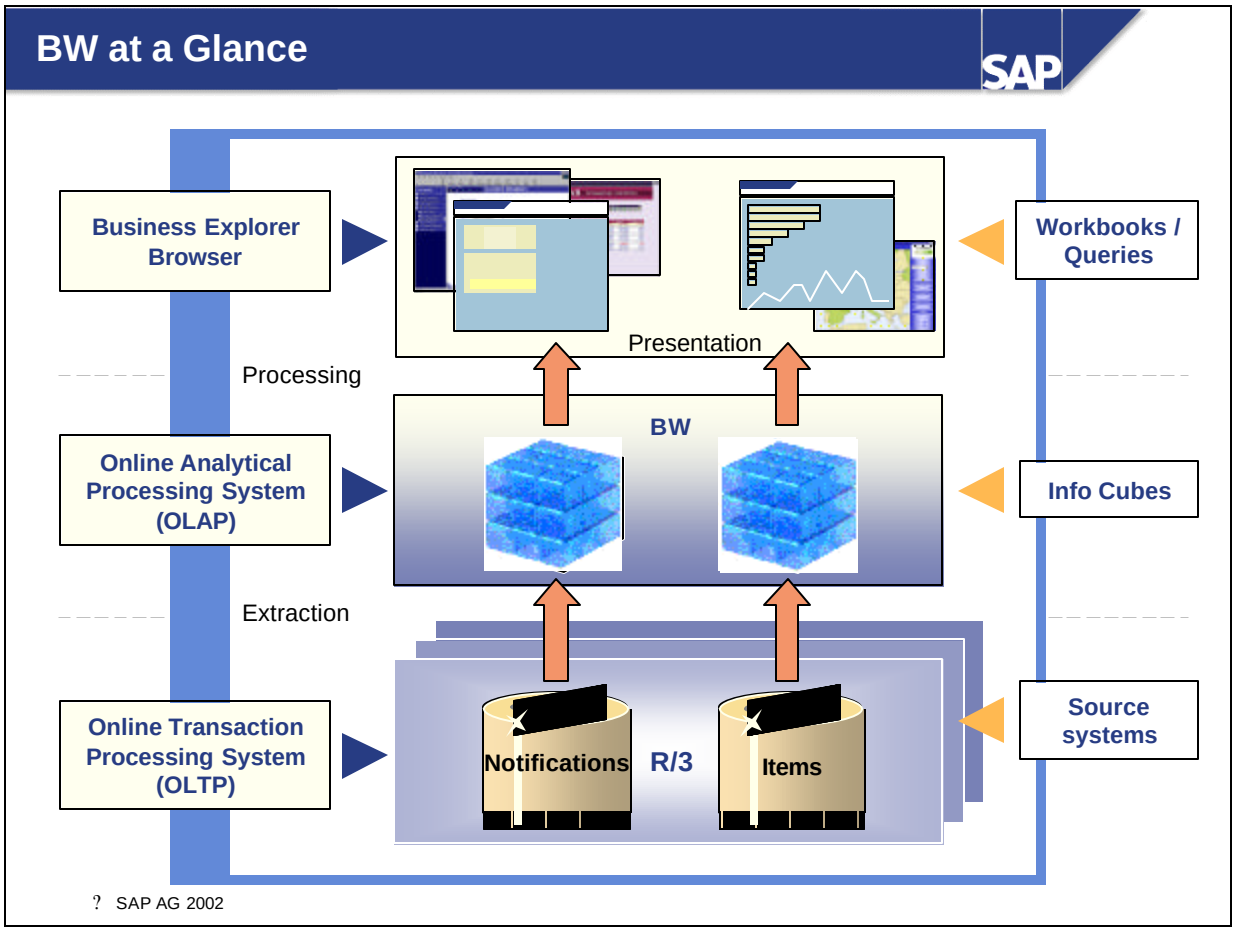

- Step 1: Data will be **extracted** from the **source systems.**
- Step 2: The extracted data is put together in **Info Cubes.** Info Cubes are structures that represent a consistent and complete data source for a given business area.
- Step 3: Based on the Info Cubes, so-called **Queries** are defined in the **Business Explorer.**

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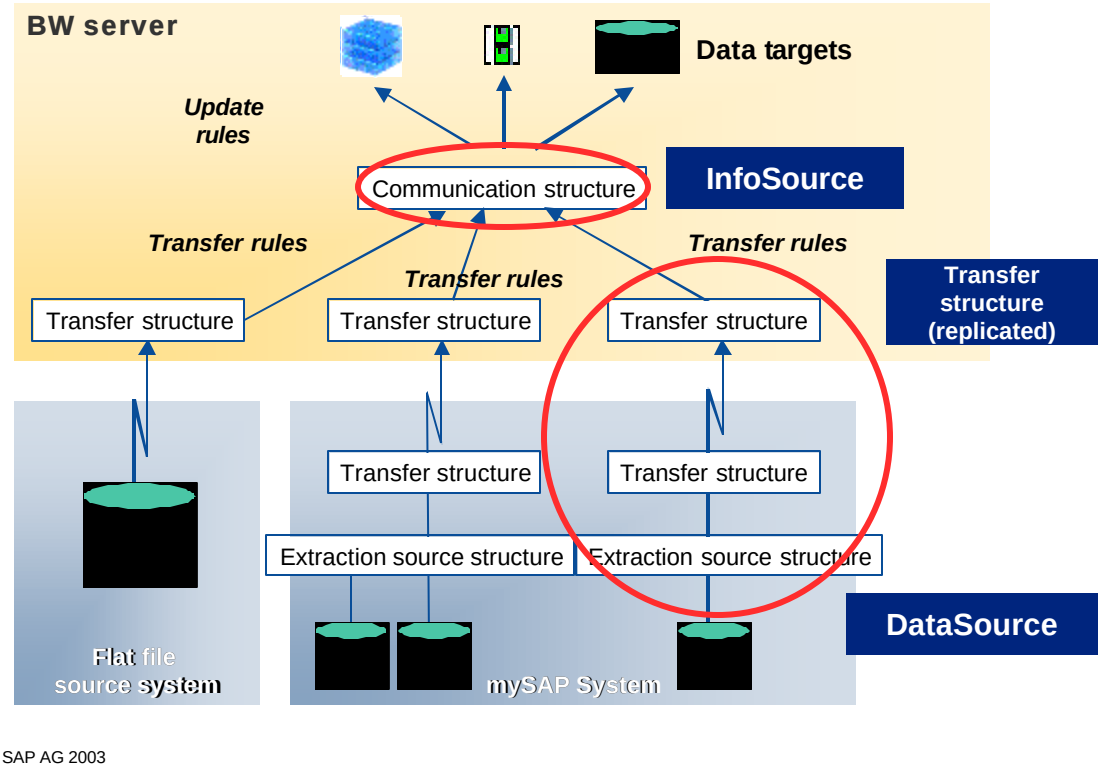
Data Flow from the Source System to BW



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- Data that logically belong together are available in the source system in the form of **Data Sources.**
- A **Data Source** comprises a quantity of fields that are provided in a flat structure (extraction structure) for data transfer into BW. It also describes the properties of the corresponding extractor regarding the data transfer into BW.
- The **extraction structure** provides the Data Source with data in the source system. It contains the quantity of the fields that are provided by an extractor in the source system for the data loading process.
- An **extractor** is a program that can load data from source system datasets into the extraction structure of a Data Source.
- The **transfer structure** is the structure in which data from the source system are transported into SAP Business Information Warehouse. It represents a selection of the fields in the source system's extraction structure.
- An **Info Source** in BW describes the quantity of all available of a type of business transaction (such as Cost Center Accounting). An InfoSource is always a quantity of Info Objects that logically belong together. The structure in which they are stored is called a **communication structure** .
- **Info Objects** are business evaluation objects. They are the superordinate term for characteristics, key figures and units.
- **Data targets** is the superordinate term for objects into which data are loaded (such as Info Cubes)
- **Info Cubes** describe a closed dataset of a business area and can be the basis for queries (= analyses).

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Terms: Data Flow and Data Model

DataSource	**Quantity of data to be transferred incl. extractors**
Extraction structure	**Quantity of fields to be transferred**
Extractor structure	**Loads data from the source system into the extraction**
Transfer structure	**Selection of fields from an extraction structure for transporting data**
InfoSource	**Quantity of all data that are logically grouped together into a business transaction. These data are represented as InfoObjects**
InfoObject	**Superordinate term for characteristics, key figures and units**
Communication structure	**Structure of an InfoSource – contains all InfoObjects belonging to an InfoSource.**
InfoCube	**Closed dataset of a business area; the basis for queries**

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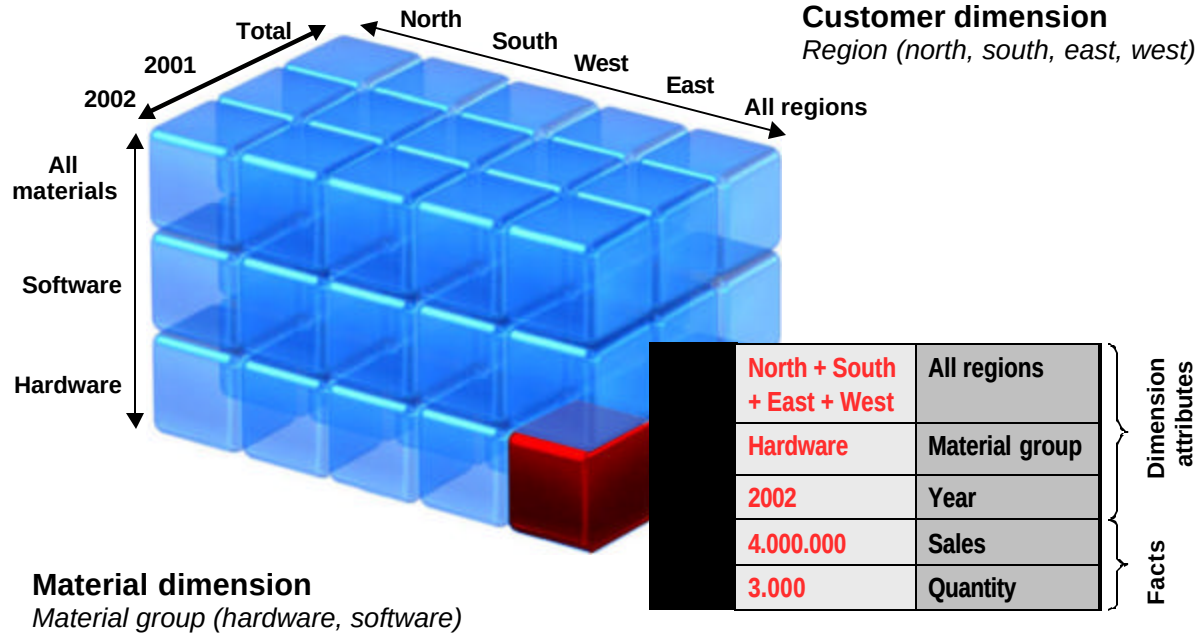
SD Example: InfoCube



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- **InfoCube**: InfoCubes are "data containers" on which reports and analyses are based in BW. They contain two types of data: characteristics and key figures. These are described in BW as InfoObjects. The InfoObjects are grouped in the InfoCube according to the star schema principle, that is, there is a (large) fact table that contains the InfoCube key figures, and several (smaller) dimension tables surrounding it, that contain the characteristics of the InfoCube (see the following pages).
- **Dimension**: A group of characteristics whose content belongs together under a common superordinate term. If the dimension contains a characteristic whose value already uniquely defines the values of all other characteristics from a business point of view, then the dimension is named after this characteristic.

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SD Example: Dimension Tables

Customer dimension table

CUSTOMER_ID	Customer name	City	Region	...
K100	Jörgensen	Oslo	North	...
K200	Fourier	Paris	West	
...	...	...	...	...

Material dimension table

MATERIAL_ID	Material name	Material group	...
M1111	Monitor	Hardware	...
M2222	Keyboard	Software	
...	...	...	...

Time dimension table

TAG_ID	Month	Quarter	Year
03.01.2002	01.2002	Q1/2002	2002
05.08.2002	08.2002	Q3/2002	2002
...	...	...	...

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Dimension table:

- A dimension should group together characteristics that logically belong together (the customer name and region belong to the customer dimension, for example). Adhering to this design criterion ensures that the dimensions remain largely independent of each other and that the data volume of the dimension tables remains small, which is necessary for performance reasons.
- From a technical point of view, several characteristics values are mapped to an abstract dimension key (DIM-ID) to which the values in the fact table relate. The characteristics selected for an InfoCube are distributed to InfoCube-specific dimensions when the InfoCube is created.

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SD Example: Fact Table

Fact table

TAG_ID	CUSTOMER_ID	MATERIAL_ID	Sales	Quantity
03.01.2002	*K100*	*M1111*	50.000	100
03.01.2002	*K100*	*M2222*	3.000	60
03.01.2002	*K200*	*M1111*	100.000	250
03.01.2002	*K200*	*M2222*	10.000	250
05.08.2002	*K100*	*M1111*	25.000	50
05.08.2002	*K200*	*M2222*	300	6
...	*...*	*...*	...	...

Combination of dimension key characteristics

Fact data

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- The fact table contains the InfoCube's key figures.
- Fact tables and dimensions are linked with each other by identifiable abstract numbers (IDs) that are in the key part of the respective database table. The key figures of the InfoCube are related to the characteristics of the dimension. The characteristics define the granularity (the fineness) in which the key figures are maintained in the InfoCube.
- Fact tables and dimension tables are relational database tables.

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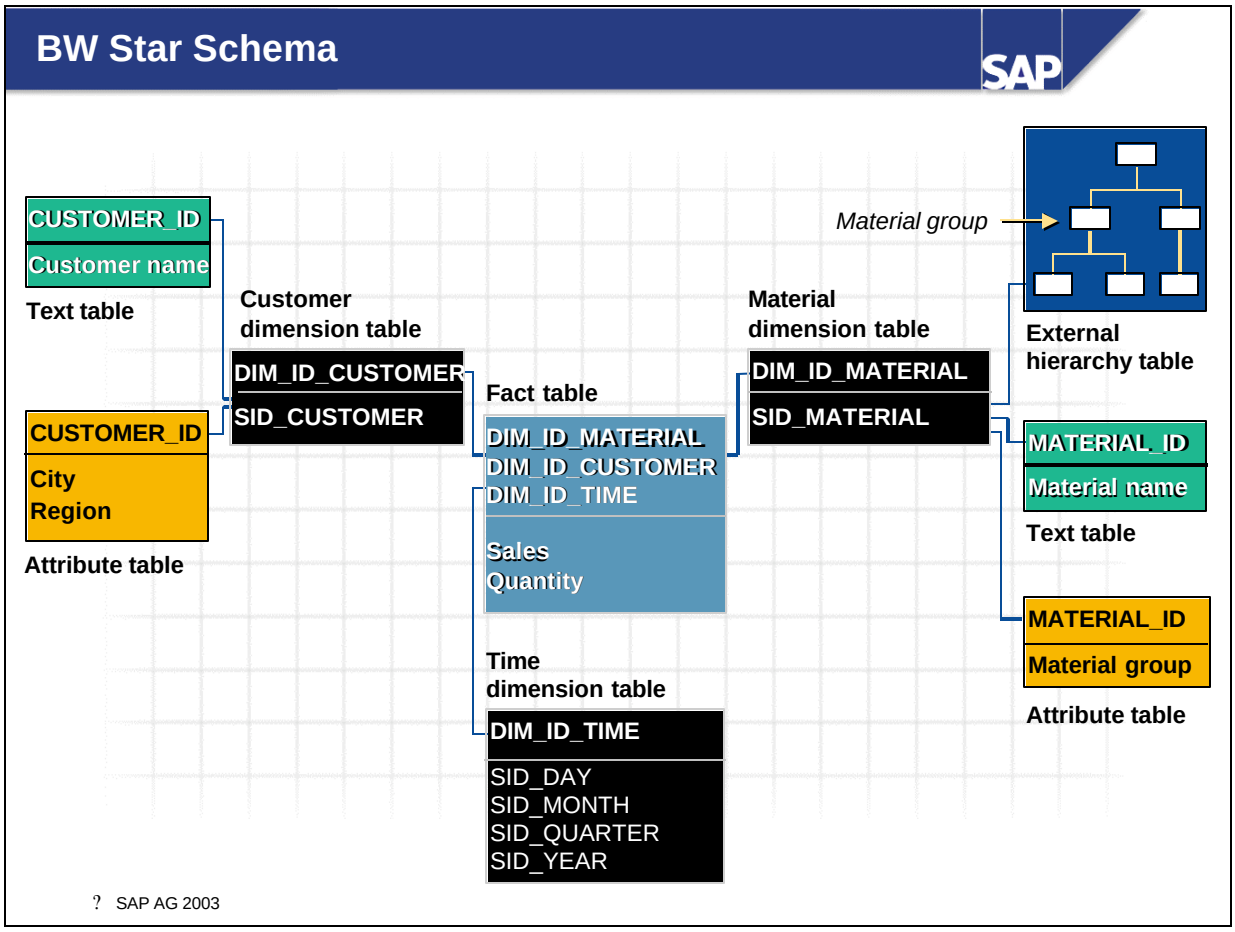

Definition in the start schema:

- With the definition of an InfoCube, characteristics are grouped together into dimensions in order to store them in a star schema table (dimension table). The basis for this can be the business grouping mentioned above. The dimensions are linked with one of the key fields in the fact table with the help of a simple foreign key dependency.
- The characteristics point to the master data and its attributes and text descriptions. All InfoObjects (that is, characteristics with their master data and key figures) are available to all InfoCubes, unlike dimensions, that represent the special organization form of characteristics in an InfoCube.
- The BW master data are transferred by uploading them from the source system, although they can be enhanced with other data from external systems.

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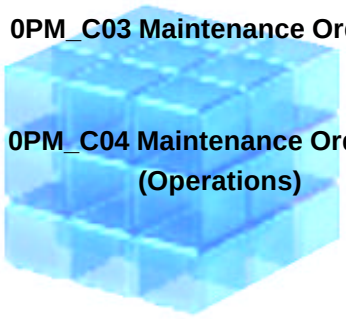
Business Content – Info Cubes for Asset Life-Cycle Management

Plant Maintenance

Info Cubes

- 0PM_C01 Maintenance Orders (Costs and Allocations)
- 0PM_C02 Equipment Dismantling
- 0PM_C03 Maintenance Orders
- 0PM_C04 Maintenance Orders (Operations)



Customer Service

Info Cubes

- 0CS_C01 Service Orders (Costs and Allocations)
- 0CS_C02 Service Orders
- 0CS_C03 Service Orders (Operations)

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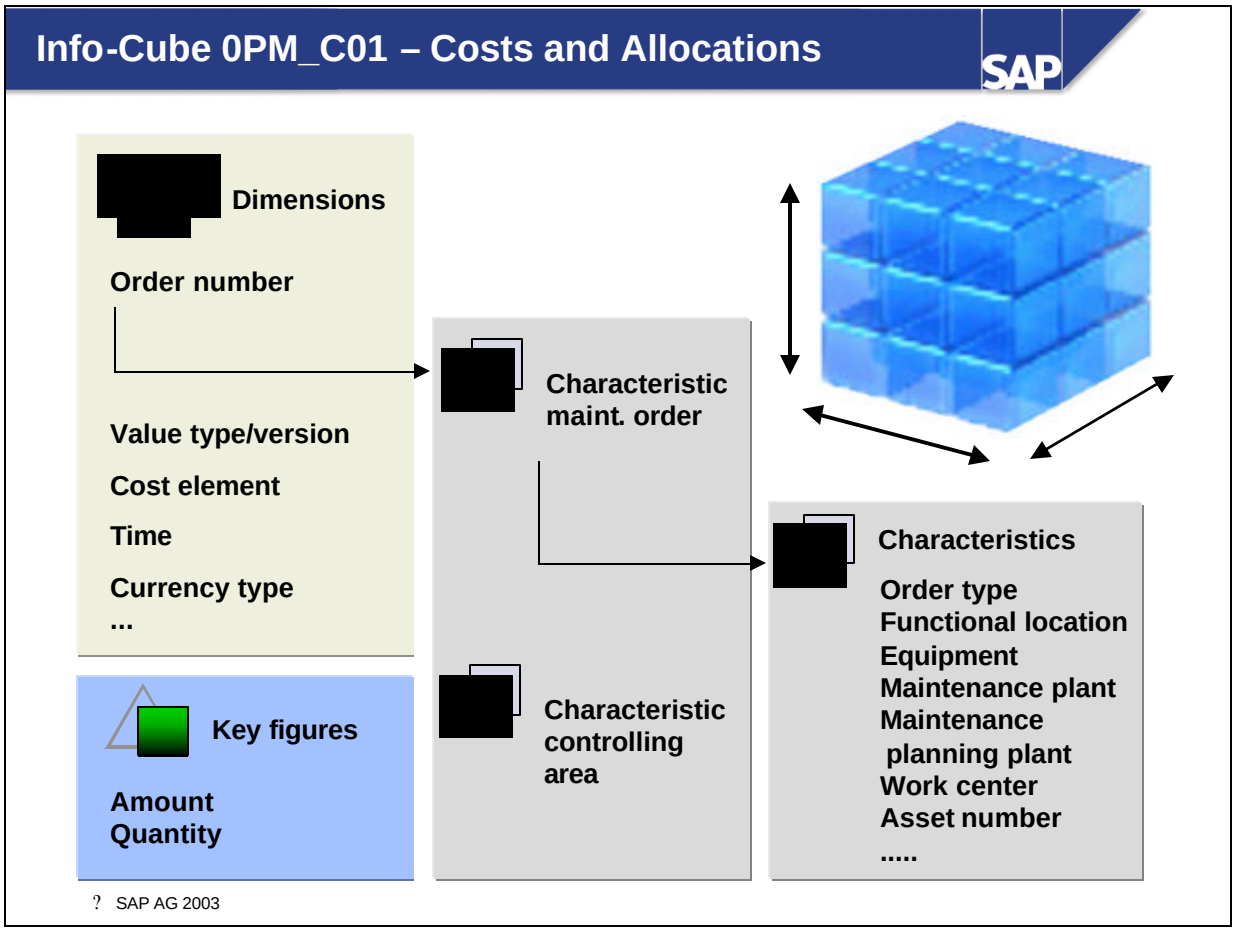

- **InfoCube 0PM_C01 (Costs and allocations)** is part of the Business Content for Plant Maintenance.
- It contains the following dimensions as order criteria:
  - Order number
  - Cost elements
  - Value type/version
  - Partner
  - Value
  - Currency type
  - Time
  - Data packet
  - Unit
- The InfoCube also has the following key figures:
  - Amount
  - Quantity

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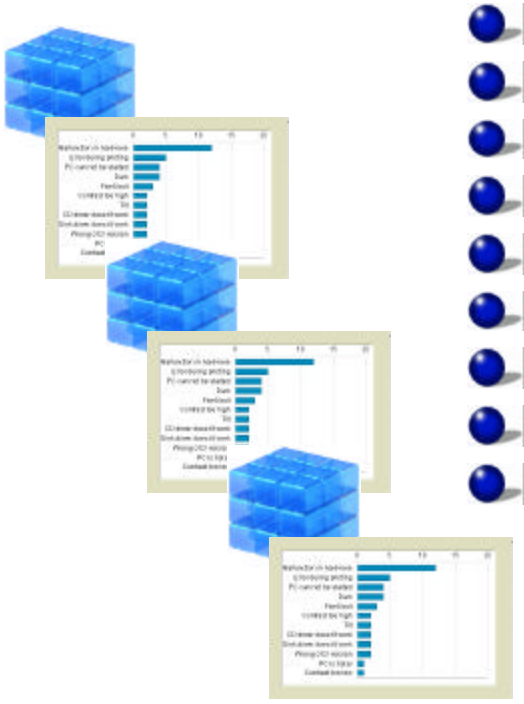
Business Content – Queries for Asset Life-Cycle Management



- Install/Dismantle equipment
- Notification analysis technical objects
- Damage analysis notifications
- Cause analysis notifications
- Tasks in notification
- Actions in notifications
- Maintenance orders
- Maintenance orders - operations
- Planned-/Actual costs variation

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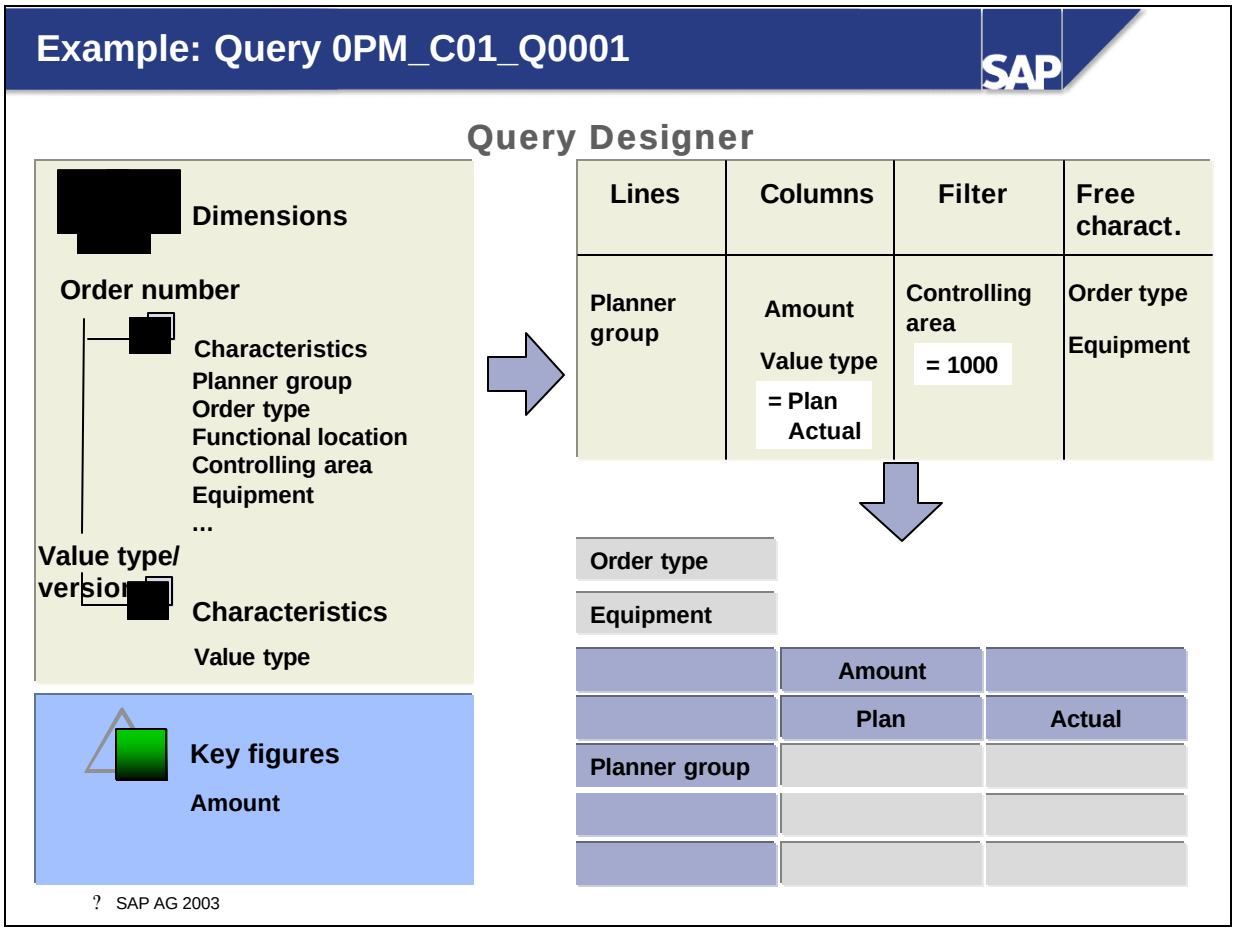

- **Query 0PM_C01_Q0001** is part of the Business Content for Plant Maintenance and is based on InfoCube 0PM_C01.
- The **Query Designer** is the tool for creating or adapting queries.
- Characteristics and key figures can be put together flexibly in the query, based on the InfoCube structure. In principle, four areas are available with which the query can be controlled:
  - **Lines**: The characteristics are entered that should appear by default when the query is called.
  - **Columns** : The key figures are entered here.
  - **Filter**: The characteristics that should be used as selection criteria, but which are not displayed in the query itself, are entered here.
  - **Free characteristic**: Characteristics are entered here that can be activated in the query if necessary and can therefore expand or specify the drilldown more precisely.
- As a result, the user is given the optimal view of the business object for his or her requirements (here: cost analysis structured according to order-related characteristics). The data that are displayed are based on the current InfoCube dataset.

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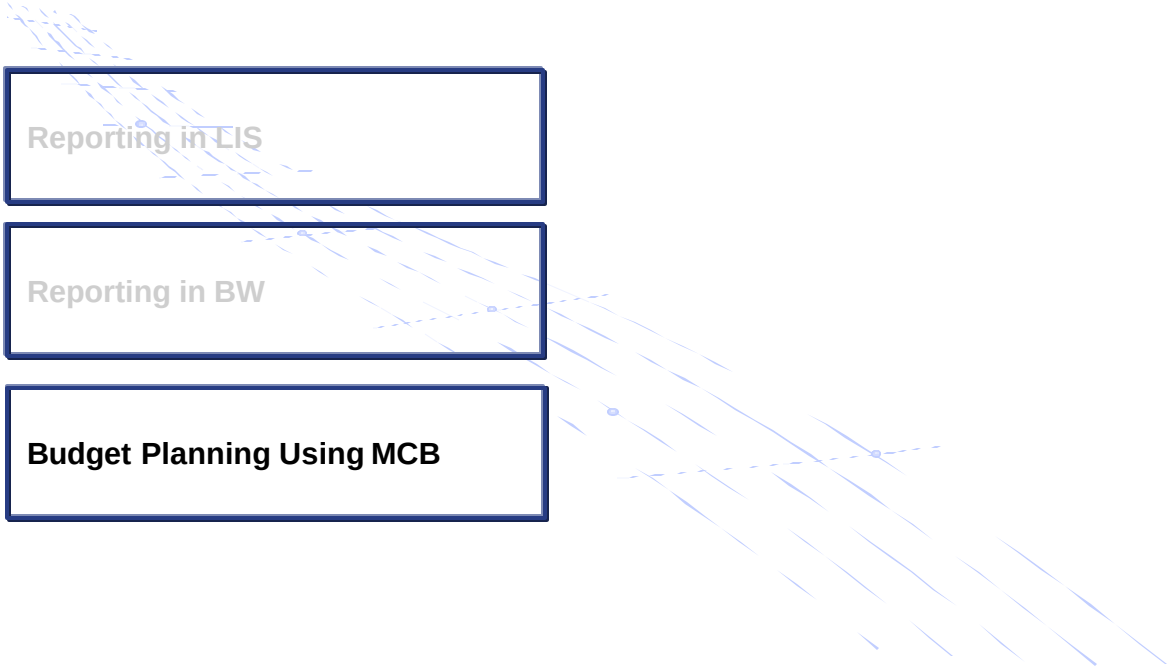
Budget Planning Using MCB



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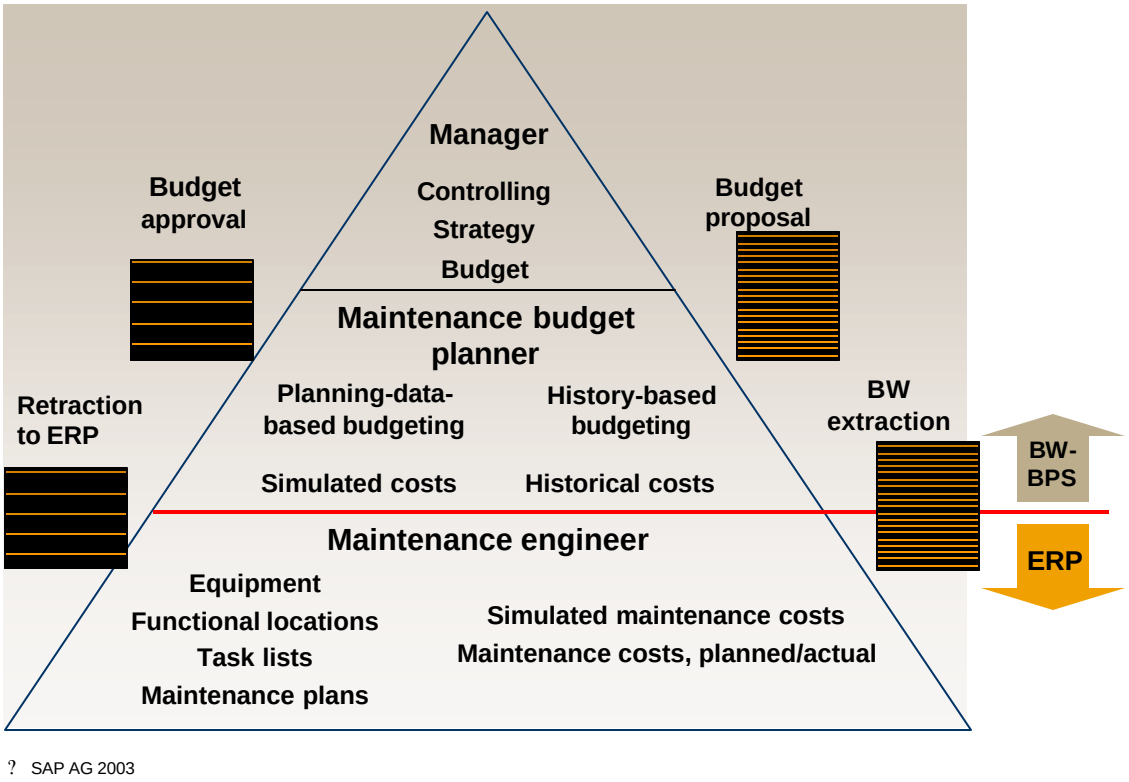
MCB: Planning Process (2)



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- The maintenance engineer makes the data basis from mySAP ERP available for budget planning, for example task list costing or maintenance plan costing, planned/actual maintenance costs from the previous year(s).
- SAP BW-BPS automatically collects or processes data for all roles of the process within an integrated planning environment.
- SAP BW-BPS can use the following two budgeting processes for planning a maintenance budget:
  - history-based budgeting
  - planning-data-based budgeting:
- The maintenance budget planner sends his or her budget proposal to the maintenance manager. The data can then be processed in SEM-BPS based on the company's controlling, company strategy and budget specifications.

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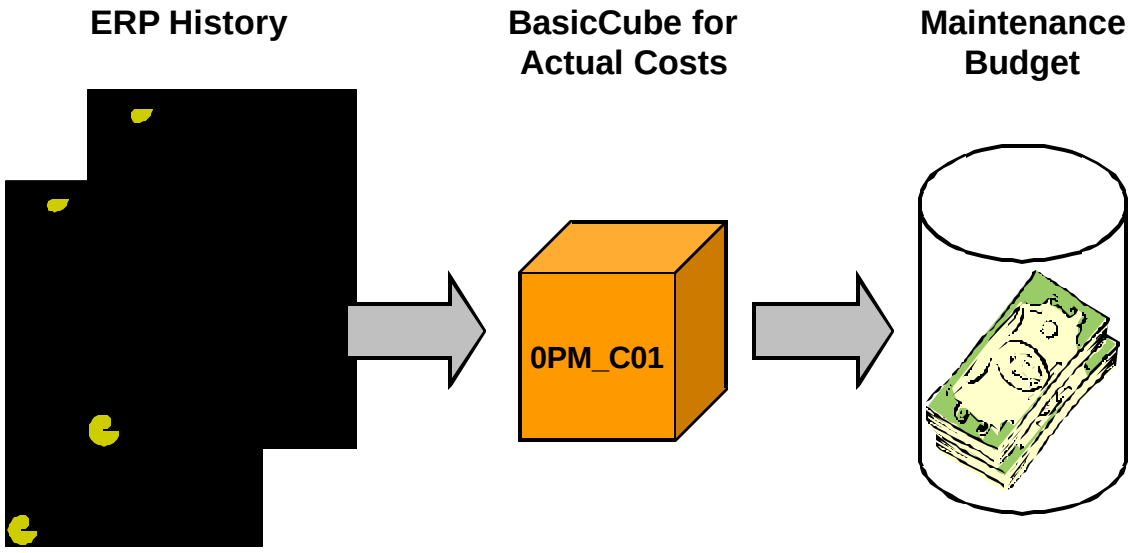
History-Based Budgeting



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- In history-based budgeting, you create your maintenance budget based on historical data, especially actual historical costs from maintenance and service orders.
- Upload your historical data on actual costs from maintenance orders or allocations from your ERP system to Business Information Warehouse (BW) InfoCube 0PM_C01. You must use the Cube Copy function to copy the data from InfoCube 0PM_C01 to BPS Planning Cube 0PM_C06. This process aggregates your data for your MCB planning application.
- This data serves as a basis for planning your maintenance budget. The following planning scenarios exist for history-based budgeting:
- **History-based scenario**: This planning scenario is based on historical data such as the equipment history or the history of function locations.
- **Ad-hoc scenario**: This planning scenario allows you to enter any data you want. In other words, when you create budget proposals, you do not necessarily have to stick to historical data.

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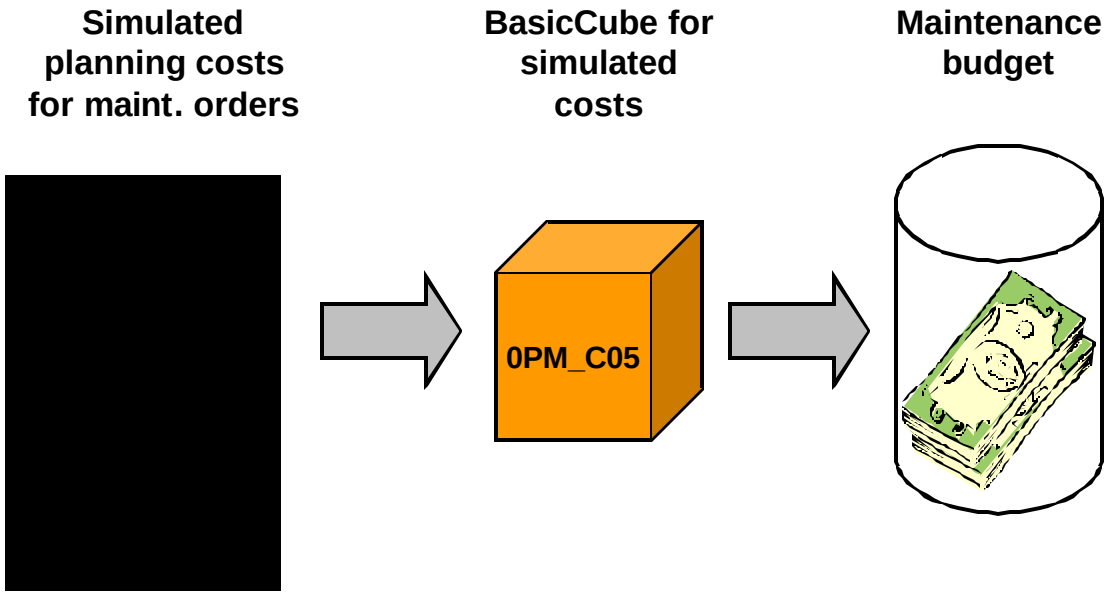
Planning-Data-Based Budgeting



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- When using planning-data-based budgeting, you create a budget based on planned data, particularly simulated planning costs. This type of budgeting is also called zero-based budgeting.
- The budget is calculated based on planned tasks instead of on actual data (see history-based budgeting). You use task lists and maintenance plans to help you plan. Planned values for activities in the lists and plans (work, external service, material) are calculated automatically and, as simulated costs, form the basis for budgeting planning.
- Upload your planning data from existing task lists or maintenance plans from your ERP systems to Business Information Warehouse (BW) Info cube 0PM_C05. You must use the Cube Copy function to copy the data from Info cube 0PM_C05 to BPS Planning Cube 0PM_C06. This process aggregates your data for your MCB planning application.
- This data serves as a basis for planning your maintenance budget. The following planning scenarios exist for planning-data-based budgeting:
- **Task list scenario**: This planning scenario is based on simulating costs of task lists.
- **Maintenance plan scenario**: This planning scenario is based on simulating costs of maintenance plans.
- **Ad-hoc scenario**: This planning scenario allows you to enter any data you want. In other words, when you create budget proposals, you do not necessarily have to stick to planning data from task lists or maintenance plans.

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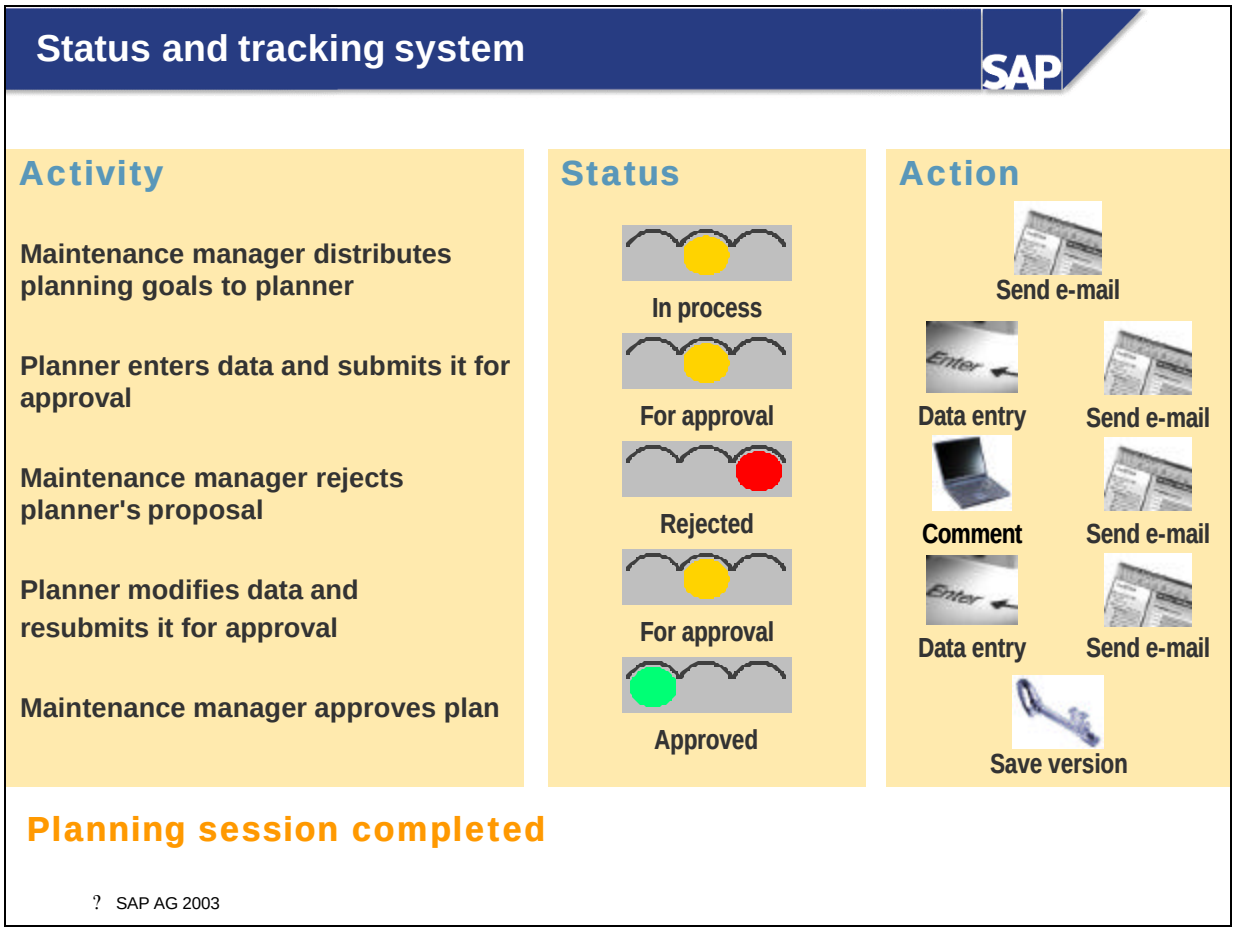

- The BW-BPS status and tracking system helps you monitor the processing progress of different planning tasks in your company.
- The status and tracking system is a Web-based application designed exclusively to be run in a Web browser. You customize subplans and the associated planning sessions in the BW system, however.
- The planning process is divided into the following elements in the status and tracking system:
  - Subplan: A concrete business subarea of company planning such as sales and profit planning, balance sheet planning, cost center planning and so on.
  - Planning session: An individual cycle of the iterative planning process; each iteration seeks to better adjust deviating planning values (for example, requirement notification vs. resource assignment, key sales figures vs. target sales revenue).
  - Organizational hierarchy: Part of your company's hierarchical organizational structure, which describes the employees involved in the planning process and the business relationships among them.

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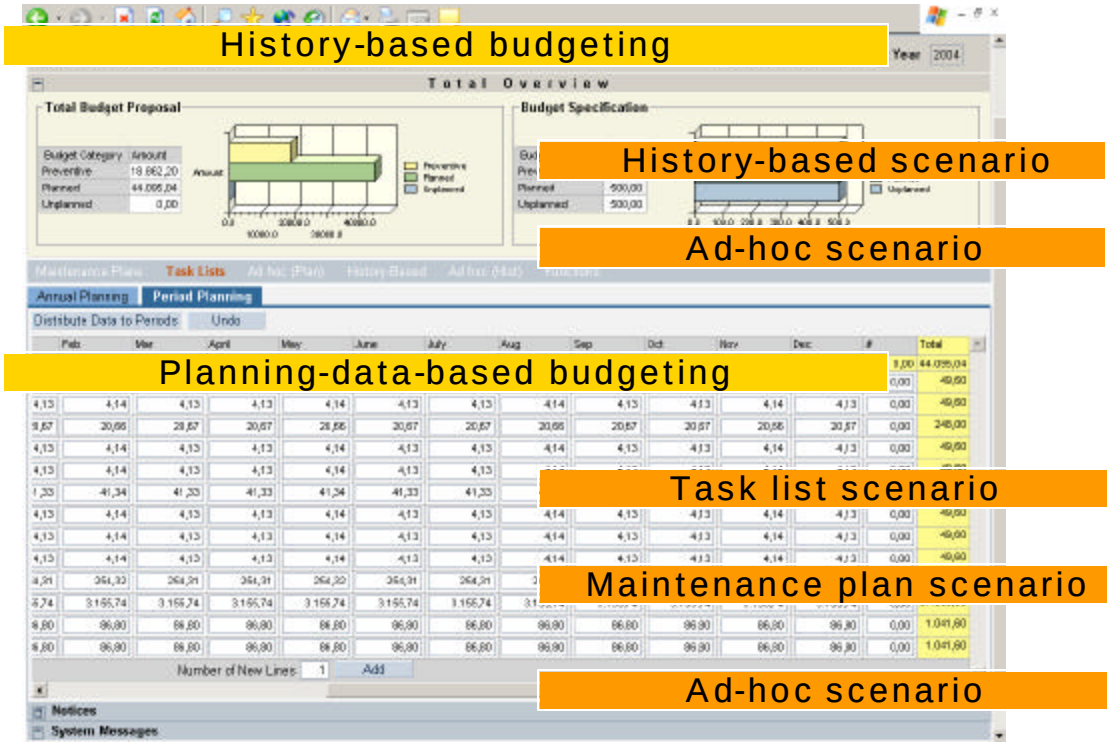
Planning Scenarios



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- The planning scenarios shown above are available for history-based and planning-data-based budgeting.
- You can use budget categories to classify a budget in relation to planning a maintenance task (for example, preventative, planned, unplanned).
  - Preventative ($M): Costs from regular maintenance work scheduled using maintenance plans.
  - Planned ($P): Costs from irregularly recurring maintenance work planned using work description templates (task lists) or planned on a case-by-case basis in orders.
  - Unplanned ($U): Costs from unplanned maintenance tasks, such as repairs during machine downtime due to damage.
- The individual budget categories are linked to the above planning scenarios via planning or history-based budgeting. For example, in the standard configuration, budget proposal costs for the Preventative budget category look like this:
  - In **planning-data-based budgeting** values are determined using the maintenance plan scenario.
  - In **history-based budgeting** values are determined using the history-based scenario or the ad-hoc scenario.

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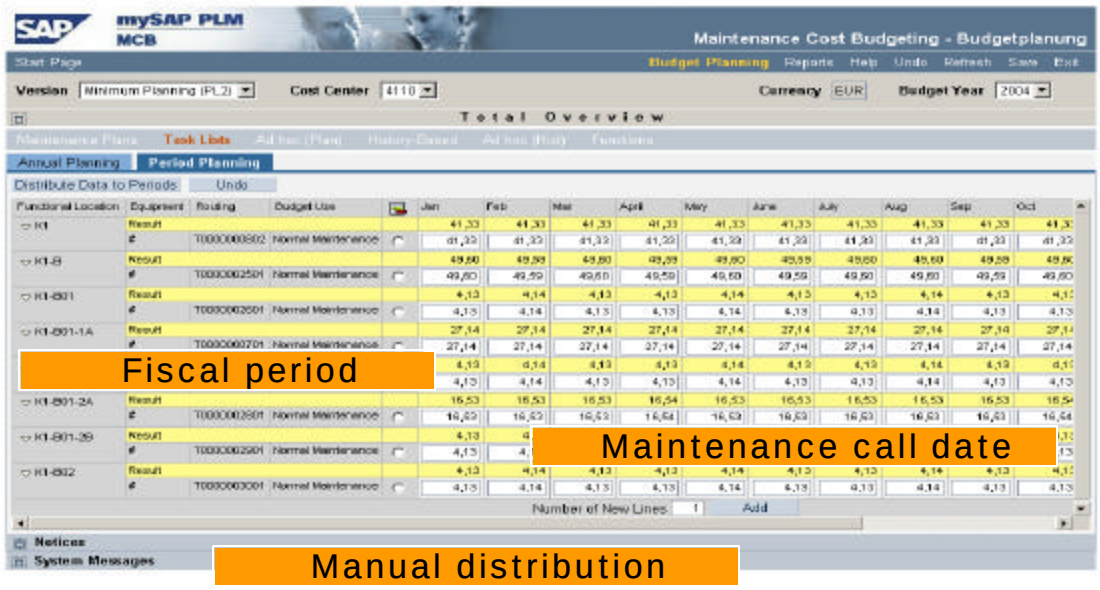
Planning Functions: Budget Distribution



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- The maintenance planner can create budget proposals based on history-based or planning-data-based budgeting. He or she can distribute data to defined periods manually or using planning functions.
- The following planning functions are available for budget distribution:
- **History-based budgeting:**
  In the *history-based scenario* you can distribute periods according to how costs from your orders occurred in the past. Alternatively you can distribute your budget proposal equally among periods.
  You can also use the *ad-hoc scenario* to distribute the budget proposal equally among periods.
- **Planning-data-based budgeting:**
  In the *task list scenario* the budget proposal is distributed equally among periods based on task lists.
  In the *maintenance plan scenario* the budget proposal is distributed among periods according to how costs from your maintenance plan scheduling occur.
  In the *ad-hoc scenario* the budget proposal is distributed equally among the periods.

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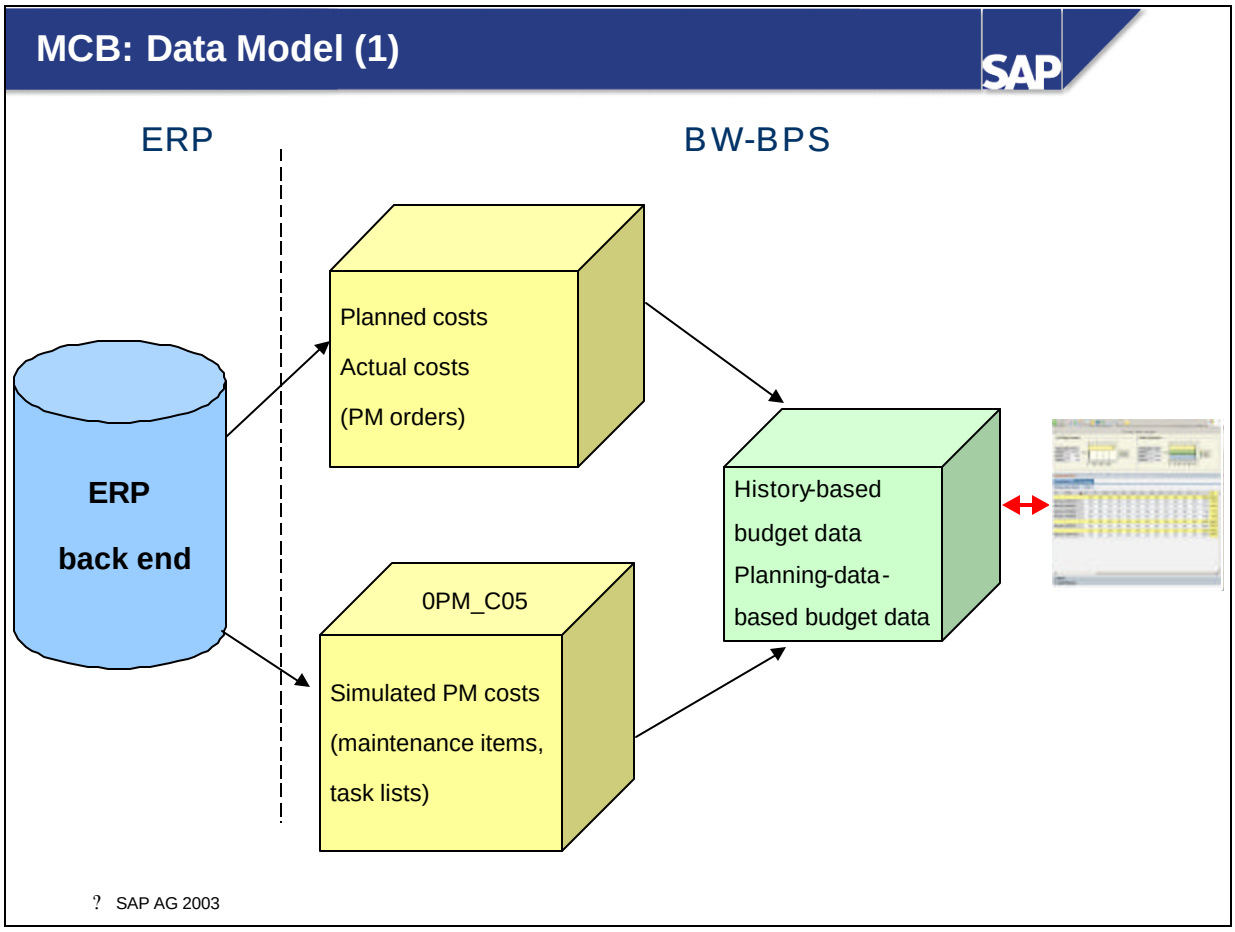

- You extract order costs from the maintenance area in the BasicCube for planned/actual PM order costs.
- ERP functions prepare maintenance plan and task list costing. The BasicCube for simulated PM order costs contains data extracted from maintenance items and PM task lists. You must extract all simulated PM costs for a particular planning period in one step. The BW operator extracts the data once all maintenance engineers have finished working on the ERP master data.
- Once the data is loaded in the BasicCube, it can be copied to the transactional Cube. The transactional Cube provides the data basis for the content that will be displayed in the Web interface.
- The Web interface serves as a single point of access for all planning scenarios for planners and managers.

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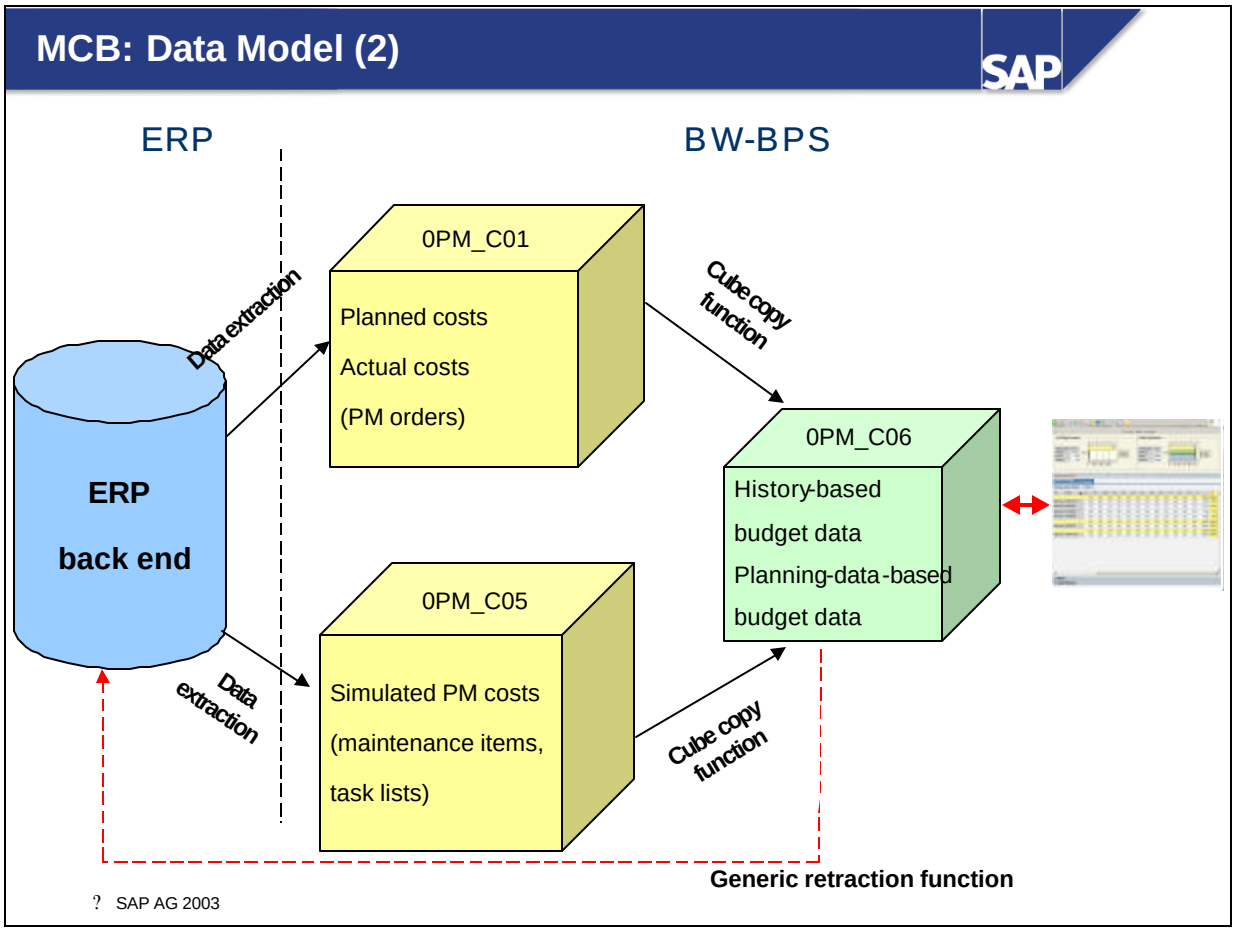

- Once you have extracted the data from the ERP system to the BasicCube, you must copy it to the BPS Planning Cube. To do so, use the Cube Copy function.
- The “Cube Copy” function also aggregates data, making the data required for the MCB planning application available.
- MCB provides you 3 areas for system Customizing functions: central Customizing (IMG), an area in BPS (transaction: BPSO) and an area in BW for hierarchy information.

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MCB: System Requirements

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- MCB is part of mySAP ERP 2004. The following components are used:
  - ERP ECC 5.00
  - Plug-in 2004.1_500
  - BW content 3.52

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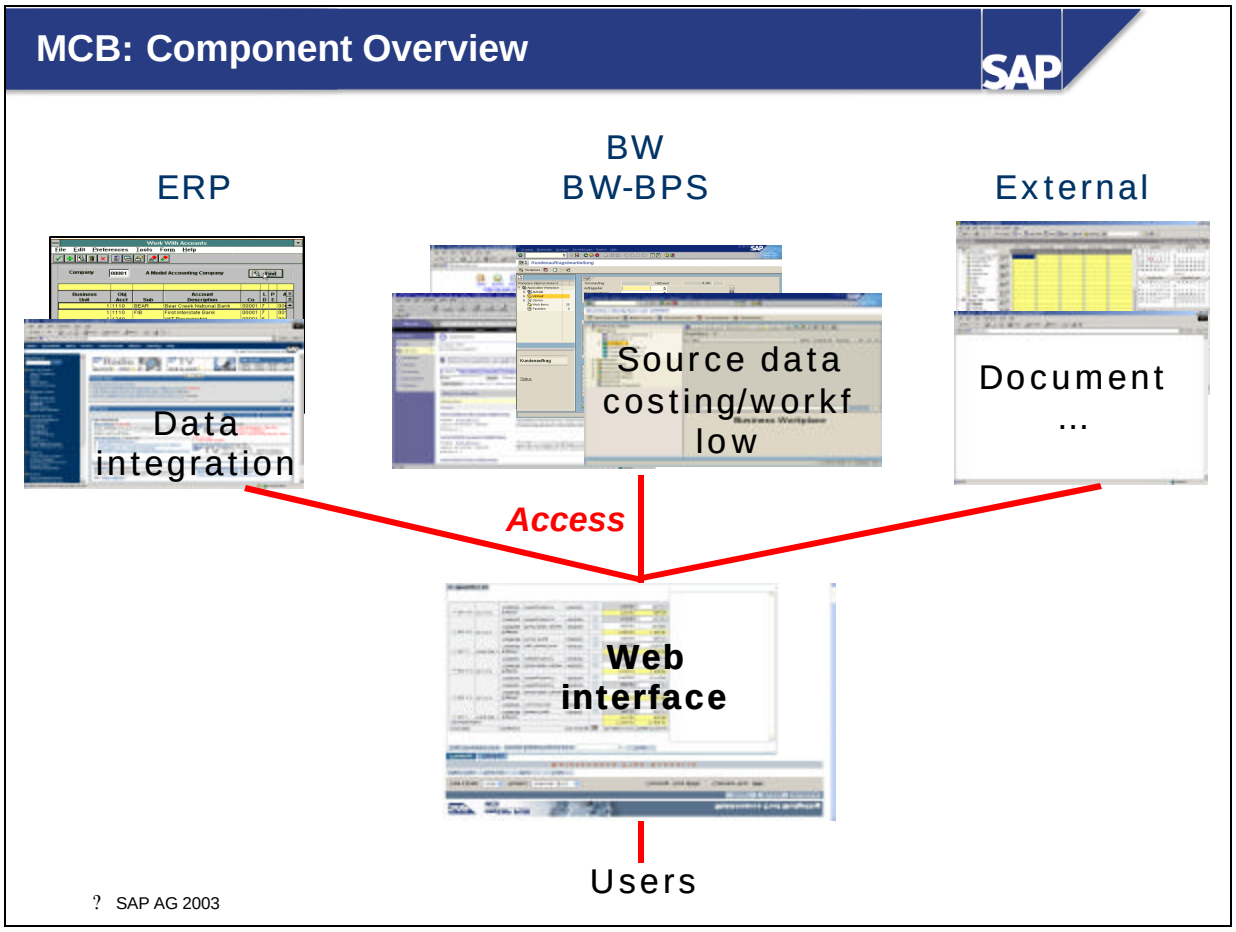

- SAP NetWeaver provides an open integration and application program and permits the integration of Enterprise Services Architecture. SAP NetWeaver is the basis for all SAP solutions on a given hardware and enables integration of mySAP ERP.
  Cost simulation data is provided using task lists or maintenance plans. This is part of mySAP ERP Operations (Enterprise Asset Management or EAM).
- Data is uploaded to BW where it can be processed further. Business planning (BW-BPS) allows you to create planning applications. BW Business Content is accessed when you create these applications.+++ BW Rel. 4.5 and later offers BW-BPS as a function that is an integrated component of BW 3.5. In earlier BW releases, BPS was available in mySAP Financials as SEM-BPS, not integrated in BW.
- Users use the Web interface to access the data made available by the components mentioned above.
- You can also use the Web interface to access non-SAP data such as documents.

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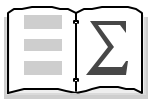
Business Intelligence: Summary



You are now able to:

- **Describe data warehouse concepts**
- **Explain the principle of cost updates**
- **Perform standard analyses**
- **Describe the business content of Plant Maintenance in BW**
- **Roughly explain the data flow from a source system into BW and the data model in BW**

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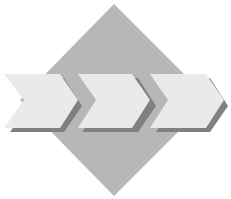
Exercises

Unit: Business Intelligence

Topic: Reporting in LIS

At the conclusion of these exercises, you will be able to:

- Use standard analyses
- Display an info structure
- Check the update of an info structure



At IDES, the standard analyses performed in the system should be performed for cost and damage analyses.

6-1-1 Performing a Standard Analysis

Perform a cost analysis for order types PM01, PM02 and PM04 for the year 2002.

How do you proceed?

How do you proceed?

_____

_____

_____

6-1-2 the key figure selection as follows:

Key figures
Orders created
Closed orders
Total costs planned
Total costs (actual)
Internal labor costs

Adjust the display of the characteristic so that the key and description are displayed. Change the column width for the characteristic so that the key and description can be read clearly.

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Save these settings as your user settings.

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6-1-3 Display the key figure *Orders created* as a time series.

How do you proceed?

_____

_____

_____

6-1-4 Perform a comparison between the key figures for *Total planned costs* and *Total actual costs.*

How do you proceed for this comparison?

_____

_____

_____

6-1-5 Change the drilldown to *Month.*

How do you proceed?

_____

_____

Call up the time axis graphic for the key figures *Total planned costs* and *Total actual costs.* How do you proceed?

_____

_____

_____

Send the time axis graphic to your neighbor by express mail.

How do you proceed?

_____

_____

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6-2-1 In Customizing in the Logistics Information System, check info structure S115 (cost analysis).

What are the characteristics of the info structure?

Characteristics
?
?
?
?

6-2-2 Determine the field names of the following key figures:

Key figures	**Field name**
Internal wage costs	?
Internal material costs	?

6-2-3 Check which value categories are used to "supply" the key figures considered in 6-2-2.

How do you proceed?

Key figures	**Field name**	**Value category**
Internal wage costs	?	?
Internal material costs	?	?

6-2-4 Check the update rules for info structure S115.

Which event triggers updating the key figure *Internal wage costs*?

What is the currency?

_____

_____

_____

_____

_____

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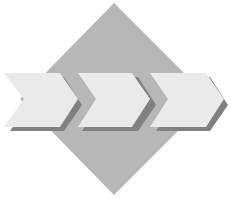
Unit: Business Intelligence

Topic: Reporting in BW

At the conclusion of these exercises, you will be able to:

- Roughly explain the essential BW terms
- Distinguish between LIS and BW



IDES AG's heterogeneous system landscape means that the core data that is essential for the management are located in different SAP and non-SAP systems.

BW should be implemented as a cross-system reporting tool to group all the data together for meaningful analyses.

6-3-1 Name the differences between LIS and BW.

6-3-2 Outline the flow of data from the source system to BW.

6-3-3 Which term is used in BW to summarize the characteristics and key figures?

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6-3-4 What is an *InfoCube*?

What is the role of the term *Dimension* in this content?

_____

_____

_____

_____

_____

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Unit: Business Intelligence

Topic: Reporting in LIS

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6-1-1 ***SAP menu*** *?* ***Logistics*** *?* ***Plant Maintenance*** *?* ***Information System***

Standard Analyses ? ***Cost Analysis***

Use ‘Multiple selection’ button for order type;
enter PM01, PM02 and PM04 as ‘single value selection’;
Copy

Enter 01.2002 to 12.2002 as the analysis period

Perform cost analysis

6-1-2 ***Edit*** *?* ***Choose key figures***

Select the key figures *Total planned costs, Total actual costs* and *Internal wage costs* and copy them to the active area;

Move key figures for planned, unplanned and immediate orders as well as *Estimated total costs* to the inactive area

Set characteristic:

Settings *?* ***Characteristic*** *?* ***Key and Description***

and

Settings *?* ***Column width*** *?* ***Characteristic***

For example, column width 30

Save the user settings:

Settings *?* ***Save settings...***

6-1-3 Position cursor on key figure ‘Orders created’

View ? ***Time series***

6-1-4 Key figure comparison:

Position cursor on key figure *Total planned costs*

Edit ? ***Comparisons*** ? ***Two key figures***

Choose *Total actual costs*

Continue

6-1-5 *Change drilldown - Month* button

Goto *?* ***Time series graphic***

Choose *Total planned costs* and *Total actual costs*

Continue

Graphics *?* ***Send***

Enter receiver PLM316-## and activate checkbox for express mail;

Choose *Send* symbol

6-2-1 *SAP menu ? Tools ? Customizing ? IMG ? Edit Project*

SAP Reference IMG button

Logistics - General *?* ***Logistics Information System*** *?* ***Logistics Data Warehouse*** *?* ***Data Basis*** *?* ***Information Structures*** *?* ***Maintain Self-Defined Information Structures***

Double-click on *Display*

Enter info structure S115

Characteristics
Order type
PM activity type
Functional location
Equipment

6-2-2 Double-click on the respective key figure:

Key figures	**Field name**
Internal wage costs	IAPERKOSE
Internal material costs	IAMATKOSE

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6-2-3 *SAP menu ? Tools ? Customizing ? IMG ? Edit Project*

SAP Reference IMG button

Plant Maintenance and Customer Service ? Information Systems for Plant Maintenance and Customer Service ? Assign Value Categories to Maintenance Cost Key Figures

Key figures	**Field name**	**Value category**
Internal wage costs	IAPERKOSE	615
Internal material costs	IAMATKOSE	400, 890

6-2-4 *SAP menu ? Tools ? Customizing ? IMG ? Edit Project*

SAP Reference IMG button

Logistics - General ? Logistics Information System ? Logistics Data Warehouse ? Updating ? Updating Definition ? Specific Definition Using Update Rules ? Maintain Update Rules

Double-click on *Display*

Enter Info structure S115 and Update group 26

Double-click on the *Internal wage costs* key figure

Result: I3 (= order)

Currency: 76 (= acquisition currency)

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Unit: Business Intelligence

Topic: Reporting in BW

6-3-1

(1) The LIS (= Logistics Information System) is part of an R/3 System. Within logistics in the application components it provides similar structures for analyses and reports; BW is an autonomous system that is independent of R/3 that has the aim of cross-system (and cross-logistics) analyses.

(2) BW enables a flexible combination of characteristics and key figures from all enterprise areas, which is not available in LIS.

(3) The BW architecture enables multi-dimensional analyses.

6-3-2

(1) A data source is defined in the source system with the extraction structure and the corresponding extraction program (extractor).

(2) The DataSource data are transferred using transfer structures with transfer rules into an InfoSource in BW, mapping the fields of the source system into BW InfoObjects.

(3) The InfoSource provides the data within a communication structure.

(4) InfoCubes are defined on the basis of the communication structures. The data are updated by update rules in the InfoCubes.

(5) InfoCubes form the basis for queries.

6-3-3 InfoObjects

6-3-4 An InfoCube is a structure of characteristics and key figures that can contain data for queries. Characteristics that logically belong together are grouped into dimensions that are stored in an internal table. Dimensions take on the character of an order criteria, grouping the characteristics into specific perspectives.

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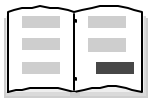
Appendix



Contents:

- **Customizing paths: Order controlling and reporting**

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Customizing Paths: Controlling and Reporting

Access to Customizing:

SAP menu *?* ***Tools*** *?* ***Customizing*** *?* ***IMG*** *?* ***Edit Project***

SAP Reference IMG button

Field Name or Data Type	Values
Settlement profile for order type	***Plant Maintenance and Customer Service*** *?* ***Maintenance and Service Processing*** *?* ***Maintenance and Service Orders*** *?* ***Functions and Settings for Order Types*** *?* ***Configure Order Types***
Maintain settlement profile	***Plant Maintenance and Customer Service*** *?* ***Maintenance and Service Processing*** *?* ***Basic Settings*** *?* ***General Order Settlement*** *?* ***Maintain Settlement Profiles***
Settlement Rule for Sub-Orders	***Plant Maintenance and Customer Service*** *?* ***Maintenance and Service Processing*** *?* ***Maintenance and Service Orders*** *?* ***Functions and Settings for Order Types*** *?* ***Settlement Rule: Define Time and Creation of Distribution Rule***
Indicate order types for investment measures	***Plant Maintenance and Customer Service*** *?* ***Maintenance and Service Processing*** *?* ***Maintenance and Service Orders*** *?* ***Functions and Settings for Order Types*** *?* ***Order Types and Investment Management*** *?* ***Indicate Order Types for Investment Measures***
Valuation variant	***Plant Maintenance and Customer Service*** *?* ***Maintenance and Service Processing*** *?* ***Maintenance and Service Orders*** *?* ***Functions and Settings for Order Types*** *?* ***Costing Data for Maintenance Orders*** *?* ***Define Valuation Variants***
Budget – rules for availability check	***Controlling*** *?* ***Internal Orders*** *?* ***Budgeting and Availability Control*** *?* ***Define Tolerance Limits for Availability Control***

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Define budget profile	***Controlling ? Internal Orders ? Budgeting and Availability Control ? Maintain Budget Profile >> Choose "Budget Profile for CO Orders"***
Assign budget profile to order type	***Plant Maintenance and Customer Service ? Maintenance and Service Processing ? Maintenance and Service Orders ? Functions and Settings for Order Types ? Configure Order Types***
Definition of customer-specific key figures	***Plant Maintenance and Customer Service ? Information Systems for Plant Maintenance and Customer Service ? Customer-Specific Key Figures ? Definition of Customer-Specific Key Figures***
Definition of value categories	***Plant Maintenance and Customer Service ? Maintenance and Service Processing ? Basic Settings ? Settings for Display of Costs ? Maintain Value Categories***
Maintain field catalogs	***Logistics - General ? Logistics Information System (LIS) ? Logistics Data Warehouse ? Data Basis ? Field Catalogs ? Maintain Self-Defined Field Catalogs***
Define update rules	***Logistics - General ? Logistics Information System (LIS) ? Logistics Data Warehouse ? Updating ? Updating Definition ? Specific Definition Using Update Rules ? Maintain Update Rules***
Maintain information structures	***Logistics - General ? Logistics Information System (LIS) ? Logistics Data Warehouse ? Data Basis ? Information Structures ? Maintain Self-Defined Information Structures***
Define investment profile	***Plant Maintenance and Customer Service ? Maintenance and Service Processing ? Maintenance and Service Orders ? Functions and Settings for Order Types ? Order Types and Investment Management ? Define Investment Profiles***
Costing sheet	***Plant Maintenance and Customer Service ? Maintenance and Service Processing ? Maintenance and Service Orders ? Functions and Settings for Order Types ? Costing Data for Maintenance Orders ? Maintain Costing Sheet***

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Costing variant	***Plant Maintenance and Customer Service*** *?* ***Maintenance and Service Processing*** *?* ***Maintenance and Service Orders*** *?* ***Functions and Settings for Order Types*** *?* ***Costing Data for Maintenance Orders*** *?* ***Maintain Costing Variants***
Cost profile	***Plant Maintenance and Customer Service*** *?* ***Maintenance and Service Processing*** *?* ***Maintenance and Service Orders*** *?* ***Basic Settings*** *?* ***Settings for Display of Costs*** *?* ***Define Default Values for Value Categories***
Cost estimate version	***Plant Maintenance and Customer Service*** *?* ***Maintenance and Service Processing*** *?* ***Maintenance and Service Orders*** *?* ***Basic Settings*** *?* ***Settings for Display of Costs*** *?* ***Define Version for Cost Estimates for Orders***
PMIS set-up	***Logistics - General*** *?* ***Logistics Information System (LIS)*** *?* ***Logistics Data Warehouse*** *?* ***Data Basis*** *?* ***Tools*** *?* ***Setup of Statistical Data*** *?* ***Application-Specific Setup of Statistical Data*** *?* ***Perform Setup - Plant Maintenance***
Commitments management for order type	***Plant Maintenance and Customer Service*** *?* ***Maintenance and Service Processing*** *?* ***Maintenance and Service Orders*** *?* ***Functions and Settings for Order Types*** *?* ***Configure Order Types***
Define transfer of project number	***Plant Maintenance and Customer Service*** *?* ***Maintenance and Service Processing*** *?* ***Maintenance and Service Orders*** *?* ***Functions and Settings for Order Types*** *?* ***Define Transfer of Project or Investment Program***
Define transfer of investment program	***Plant Maintenance and Customer Service*** *?* ***Maintenance and Service Processing*** *?* ***Maintenance and Service Orders*** *?* ***Functions and Settings for Order Types*** *?* ***Define Transfer of Project or Investment Program***
Currency for maintenance statistics	***Plant Maintenance and Customer Service*** *?* ***Information Systems for Plant Maintenance and Customer Service*** *?* ***Define Currency for Maintenance Statistics***

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Time for maintenance of settlement rule	***Plant Maintenance and Customer Service*** *?* ***Maintenance and Service Processing*** *?* ***Maintenance and Service Orders*** *?* ***Functions and Settings for Order Types*** *?* ***Settlement Rule: Define Time and Distribution Rule***
Assignment of IM assignment key to order type	***Plant Maintenance and Customer Service*** *?* ***Maintenance and Service Processing*** *?* ***Maintenance and Service Orders*** *?* ***Functions and Settings for Order Types*** *?* ***Assign IM Assignment Key to Order Types***
Assignment of cost elements to value categories	***Plant Maintenance and Customer Service*** *?* ***Maintenance and Service Processing*** *?* ***Basic Settings*** *?* ***Settings for Display of Costs*** *?* ***Assign Cost Elements to Value Categories***
Assignment of value categories to cost key figures	***Plant Maintenance and Customer Service*** *?* ***Information Systems for Plant Maintenance and Customer Service*** *?* ***Assign Value Categories to Maintenance Cost Key Figures***

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